



TITLE:

THE PELAGIC COPEPODS OF THE  
IZU REGION, MIDDLE JAPAN  
SYSTEMATIC ACCOUNT XII -  
FAMILIES ARIETELLIDAE,  
PSEUDOCYCLOPIDAE,  
CANDACIIDAE AND PONTELLIDAE-

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CITATION:

Tanaka, Otohiko. THE PELAGIC COPEPODS OF THE IZU REGION, MIDDLE JAPAN  
SYSTEMATIC ACCOUNT XII -FAMILIES ARIETELLIDAE, PSEUDOCYCLOPIDAE, CANDACIIDAE  
AND PONTELLIDAE-. PUBLICATIONS OF THE SETO MARINE BIOLOGICAL LABORATORY  
1964, 12(3): 231-271

ISSUE DATE:

1964-11-30

URL:

<http://hdl.handle.net/2433/175365>

RIGHT:

THE PELAGIC COPEPODS OF THE IZU REGION, MIDDLE JAPAN  
SYSTEMATIC ACCOUNT XII

FAMILIES ARIETELLIDAE, PSEUDOCYCLOPIDAE,  
CANDACIIDAE AND PONTELLIDAE

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*With 21 Text-figures*

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Family ARIETELLIDAE.

Genus *Arietellus* GIESBRECHT.

From the Malay Archipelago A. SCOTT recorded three species of the genus, namely, *A. aculeatus* (T. SCOTT), *A. setosus* GIESBRECHT and *A. simplex* SARS. SEWELL recorded the occurrence of the latter two species from the Indian seas. BRODSKY recorded *A. setosus* GIESBRECHT, *A. simplex* and *A. pacificus* ESTERLY from the far-eastern seas of the USSR. From the Izu region I have recorded the occurrence of *A. simplex* and *A. giesbrechti* SARS.

*Arietellus giesbrechti* SARS.

(Fig. 220, a-h)

*Arietellus giesbrechti*, SARS, 1905, p. 21; SARS, 1925, p. 331, pl. cxix, figs. 1-6.

*Female*. Length, 5.12 mm : cephalothorax, 4.06 mm ; abdomen, 1.06 mm. The head separates from the 1st thoracic segment ; the last two thoracic segments are fused. The head obtusely triangular in front. The last thoracic segment produced on each side into an acute expansion but they are asymmetrical ; the left side more produced than the right. The rostral filaments slender.

The abdomen 4-jointed, the segments and furca are in the proportional lengths as 30:13:8:17:32=100. The genital segment contracts near the distal lateral margin ; the genital opening produced below near the proximal. The furcal rami asymmetrical ; the right ramus slightly wider than the left.

The 1st antenna 20-jointed, extends to the distal margin of the cephalothorax ; the segments are in the following propotional lengths :

Segment	1-2	3	4	5	6	7	8	9	10	11	12	13	14	15
	178	40	20	20	16	14	12	7	7	12	12	50	60	68
	16	17	18	19	20	21-22-23-24-25								
	76	84	84	88	65	84				=1000				

The 2nd antenna slender; the exopod much shorter than the endopod (29:45). The mandible, maxillae and maxilliped as those of *setosus* described by previous authors.

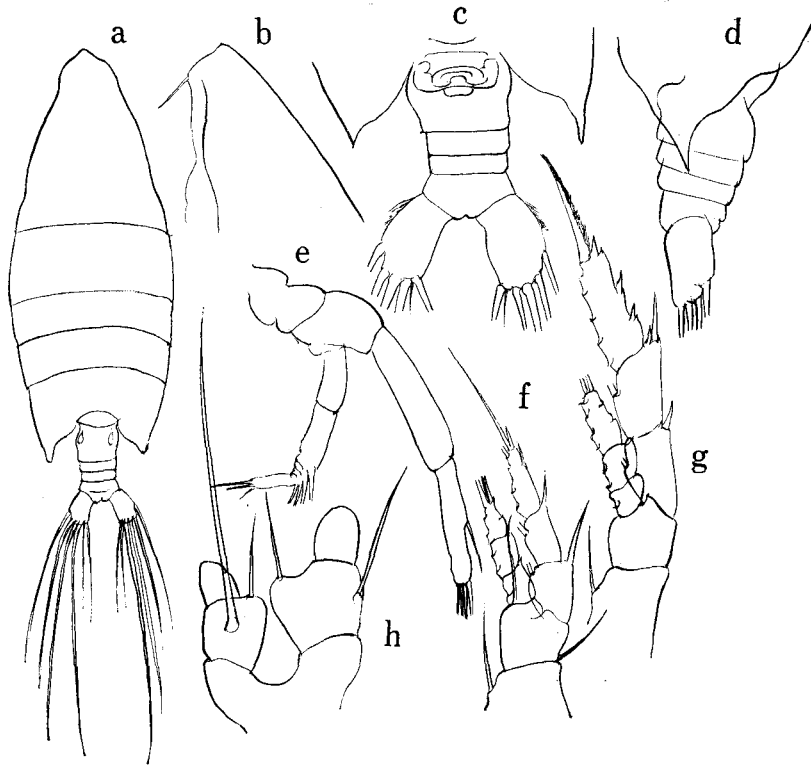


Fig. 220. *Arietellus giesbrechti* Sars.

Female: a, dorsal aspect; b, head, lateral aspect; c, last thoracic segment and abdomen, ventral aspect; d, last thoracic segment and abdomen, lateral aspect; e, 2nd antenna; f, 1st leg; g, 2nd leg; h, 5th pair of legs.

The 1st to 4th legs have each 3-jointed exopod and endopod. The terminal spine of the exopod of the 3rd leg has coarse teeth.

The 5th pair of legs asymmetrical: the left leg larger than the right; the 2nd basal segment 1-jointed, has no strong spine on the distal margin as is figured by Sars.

*Remarks.* The present specimen agrees well with the description and

figures of *A. giesbrechti* given by Sars except that the 5th pair of legs is asymmetrical and in the spinulation on the 2nd and 3rd segments. The present specimen appears to be an abnormal example of the species.

*Occurrence.* One female in the vertical haul from depths 400-0 m in Sagami.

*Distribution.* The species has been recorded from the temperate Atlantic.

*Arietellus simplex* Sars.

(Fig. 221, a-h)

*Arietellus simplex*, Sars, 1905, p. 22; A. Scott, 1909, p. 143; Wolfenden, 1911, p. 331; Sars 1925, p. 334, pl. cxx, figs. 1-6; Sewell, 1932, p. 329; Jespersen, 1934, p. 116; Brodsky, 1950, p. 395, text-fig. 281; Vervoort, 1957, p. 141.

*Female.* Length, 5.77 mm : cephalothorax, 4.40 mm ; abdomen, 1.37 mm. The

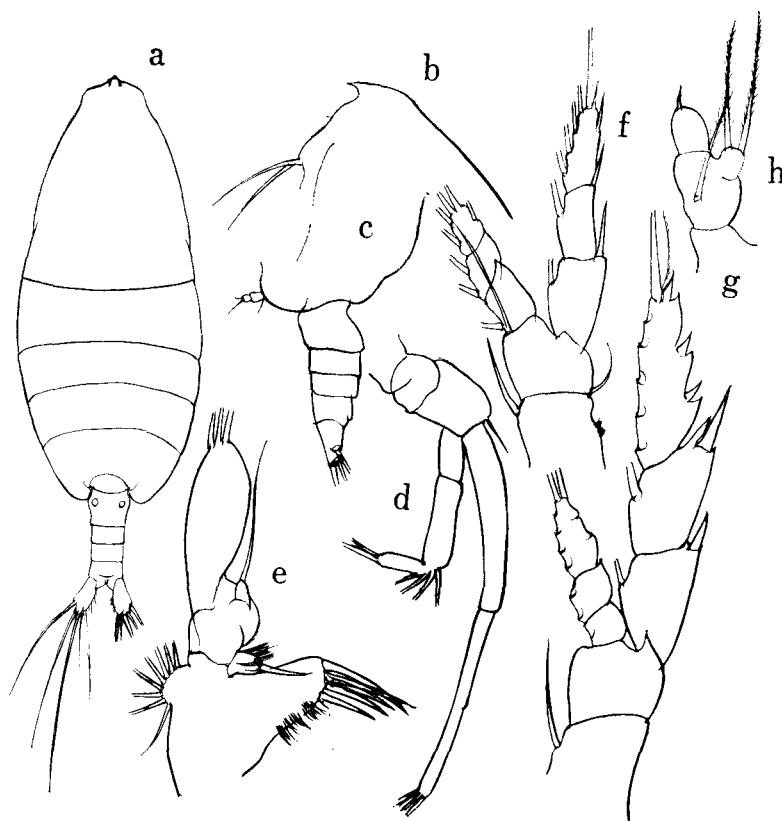


Fig. 221. *Arietellus simplex* Sars.

Female: a, dorsal aspect; b, head, lateral aspect; c, last thoracic segment and abdomen, lateral aspect; d, 2nd antenna; e, 1st maxilla; f, 1st leg; g, 2nd leg; h, left 5th leg.

head separates from the thoracic segment; the last two thoracic segments are fused. The cephalothorax robust and ovate. The head attenuates anteriorly and produced into a median crest. The last thoracic segment broadly rounded but produced at the postero-lateral margin. The rostral filaments slender and long.

The abdomen 4-jointed; the segments and furca are in the proportional lengths as 31:16:13:12:28=100. The genital segment about as long as wide, slightly produced below near the proximal ventral margin. The furcal rami about 2 time as long as wide.

The 1st antenna extends to the end of the thoracic segment. The 2nd antenna slender, the endopod 2 times as long as the exopod. The mandible has no endopod, the biting part simple in structure. The 1st maxilla without 3rd inner lobe; the endopod is represented by a single strong seta. The maxilliped as that of *setosus* figured by GIESBRECHT.

The 1st to 4th swimming legs have each 3-jointed exopod and endopod. The 5th pair of legs has 1-jointed exopod and 1-jointed endopod; the endopod is furnished with 2 setae of about equal lengths at the distal margin; the seta on the 2nd basal segment of the right leg longer than that of the left.

*Remarks.* Sars' female specimen from the temperate Atlantic measured 6.60 mm; A. Scott's male specimen measured 6.2 mm.

*Occurrence.* Three females from Sagami from depths 1000-0 m.

*Distribution.* The species has been recorded from the temperate Atlantic, Malay Archipelago and Indian seas, also from the far-eastern and polar seas of the USSR.

### Genus *Paraugaptilus* WOLFENDEN.

The genus was created by WOLFENDEN to accommodate *Paraugaptilus buchani* WOLFENDEN taken from the Atlantic. A. SCOTT recorded the second species *P. similis* A. SCOTT from the Malay Archipelago. SEWELL failed to detect any of the species from the Indian seas. BRODSKY recorded *P. buchani* WOLFENDEN from the far-eastern and polar seas of the USSR. From the Izu region I have recorded *P. buchani* in the immature stage.

The genus is closely allied to *Arietellus* differing chiefly from the latter in the structure of the female 5th pair of legs.

### *Paraugaptilus buchani* WOLFENDEN.

(Fig. 222, a-f)

*Paraugaptilus buchani* Sars, 1825, p. 336, pl. cxxi, figs. 1-16; BRODSKY, 1950, p. 397, text-fig. 283.

*Immature female.* Length, 2.75 mm. The head separates from the thoracic segment. The last two thoracic segments are fused. The head contracts gradually in front. The lateral corner of the last thoracic segment rounded. The rostrum has an obtuse basal part to which slender filaments are attached. The abdomen 2-jointed.

The 1st antenna short, reaching about to the end of the 2nd thoracic segment. The 2nd antenna has a slender endopod, about 2 times as long as the exopod. The mandible uniramous, the biting part has 3 strong teeth. The 1st maxilla rather simple in structure; the 1st inner lobe has 4 setae, the 2nd

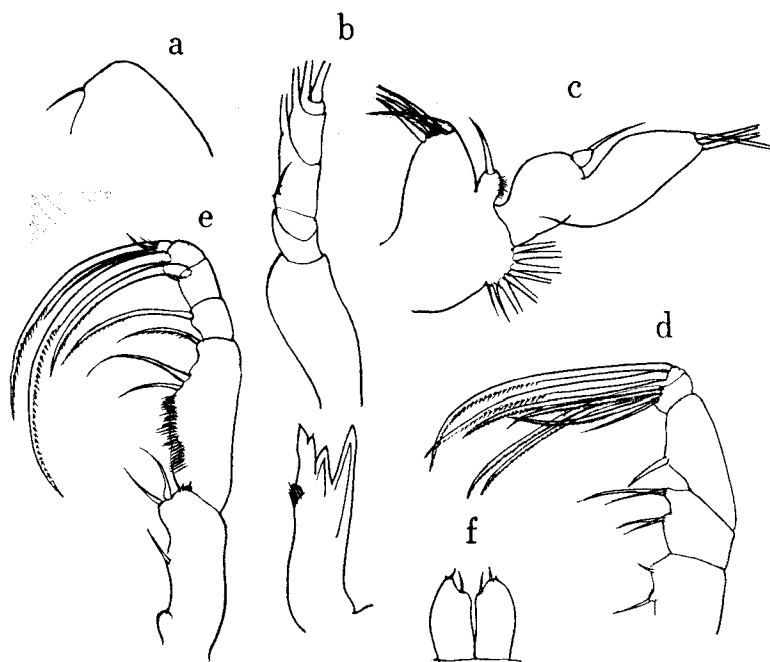


Fig. 222. *Paraugaptilus buchani* WOLFENDEN.

Female juv : a, head, lateral aspect ; b, mandible ; c, 1st maxilla ; d, 2nd maxilla ; e, maxilliped ; f, 5th pair of legs.

lobe and endopod have each 1 seta, the exopod has 3 long setae of equal lengths, the outer lobe has 6 long and 2 short setae. The 2nd maxilla has the following numbers of setae on the various lobes : 1 on the 1st lobe, 1 on the 2nd, 2 on the 3rd, 2, 2 on the 4th, 1 on the 5th, 3 on the 6th, 5 on the endopod ; the setae on the segments of the endopod are furnished with a row of short spinules along the posterior margin. The maxilliped characteristic ; the 2nd basal segment is furnished with stiff hairs on the inner margin ; the segments 1 to 4 of the endopod carry each a strong seta ; the distal segment of the endopod has 4 setae of which the outer proximal 2 very small.

The swimming legs undeveloped, the exopod and endopod 2-jointed. The 5th pair of legs undeveloped, 1-jointed and carries a short terminal and an inner marginal setae.

*Remarks.* The present specimen is clearly an immature specimen in the Copepodite III belonging to *Paraugaptilus*; it differs from *P. buchani* described and figured by Sars in the armature of the maxilliped and 5th pair of legs, and comes nearest to *P. buchani*.

*Occurrence.* One immature specimen from Sagami from deep water.

*Distribution.* The species has been recorded from the temperate Atlantic and the far-eastern and polar seas of the USSR.

#### Genus *Metacalanus* CLEVE.

The genus comprises a single species *Metacalanus aurivillii* CLEVE which has been recorded from the Malay Archipelago and Indian seas. None of the examples have been found from the Izu region. The species appears to be an endemic fauna of the tropical region.

#### Genus *Phyllopus* BRADY.

Four species of the genus, *Phyllopus bidentatus* BRADY, *P. helgae* FARRAN, *P. impar* FARRAN and *P. giesbrechti* A. SCOTT have been recorded from the Malay Archipelago. BRODSKY recorded the occurrence of *P. bidentatus*, *P. helgae* and *P. integer* ESTERLY from the far-eastern and polar seas of the USSR. I have recorded *P. helgae* from Suruga Bay. In the present collection the following three species were added: *P. bidentatus*, *P. impar* and *P. mutatus*, of which the last one appears to be undescribed.

#### *Phyllopus bidentatus* BRADY.

*Phyllopus bidentatus*, BRADY, 1883, p. 78, pl. 5, figs. 7-16; A. SCOTT, 1909, p. 147, pl. xlv, figs. 1-9; BRODSKY, 1950, p. 399, text-fig. 284; VERVOORT, 1957, p. 141.

*Female.* Length, 3.01 mm: cephalothorax, 2.06 mm; abdomen, 0.95 mm. The cephalothorax ovate. The head separates from the 1st thoracic segment; the 4th thoracic segment fused with the 5th. The last thoracic segment asymmetrical; the right side is more elongated and extends to the distal margin of the genital segment; the lateral distal margin of the segment obliquely truncate. The rostrum short and pointed.

The abdomen 4-jointed, the segments and furca are in the proportional lengths as 38:15:13:19:15=100. The genital segment longer than wide; the lateral margins of the segment parallel. The furcal rami about 1.3 times as wide as long.

The 1st antenna 24-jointed, extends about to the middle of the last thoracic segment. The mouth parts and swimming legs as figured by previous authors.

The 5th pair of legs as described and figured by A. SCOTT (pl. xlv, fig. 9).

*Male*. Length, 2.88 mm: cephalothorax, 2.00 mm; abdomen, 0.88 mm. The last thoracic segment symmetrical. The lateral corner of the last thoracic segment symmetrical, rounded with a minute process on the posterior margin.

In the 5th pair of legs the distal segment of the left leg swollen near the inner proximal margin and has a tooth-like process on the distal end;

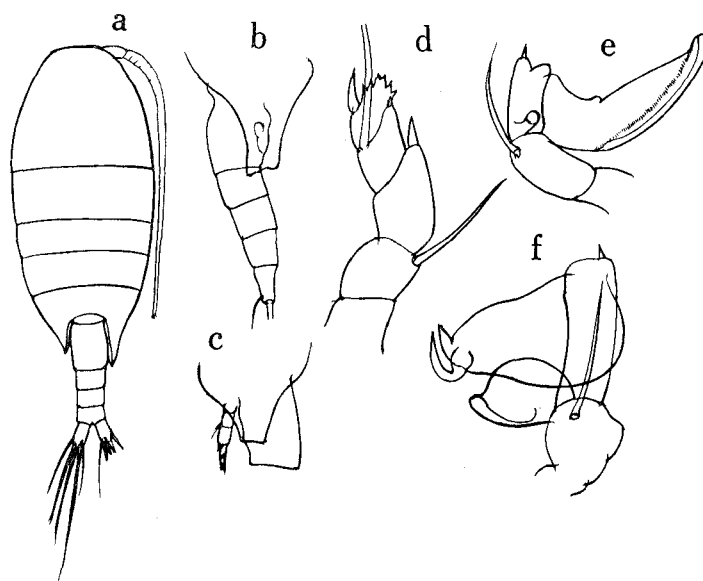


Fig. 223. *Phyllopus bidentatus* BRADY.

Female: a, dorsal aspect; b, last thoracic segment and abdomen, lateral aspect, right side; c, last thoracic segment, lateral aspect, left side; d, 5th leg. Male: e, right 5th leg; f, left 5th leg.

a curved claw arises from the outer distal margin of the segment which is about half the length of the segment. In the right leg the 3rd segment has a characteristic club-shaped process on the inner proximal margin.

*Remarks*. The form described and figured by GIESBRECHT under the name *bidentatus* slightly differs from that described by A. SCOTT in the proportional length and in the shape of the last thoracic segment. According to A. SCOTT GIESBRECHT's specimen is identical with *Phyllopus giesbrechti* A. SCOTT taken from the Malay Archipelago. The male 5th pair of legs of *bidentatus* resembles that of *impar* but differs from the latter in having a small distal tooth and a short curved claw on the distal segment of the left 5th leg.



*Occurrence.* 8 females and 5 males from the deep water of the Izu region.

*Distribution.* The species has been recorded from the Pacific, Atlantic, Malay Archipelago and the far-eastern and polar seas of the USSR.

*Phyllopus impar* FARRAN.

(Fig. 224, a-f)

*Phyllopus impar*, FARRAN, 1908, p. 84, pl. ix, figs. 1-4; A. SCOTT, 1909, p. 149, pl. xlv, figs. 10-18; SARS, 1925, p. 340, pl. cxxiii, figs. 1-17.

*Female.* Length, 2.88mm : cephalothorax, 2.00mm ; abdomen, 0.88mm. The cephalothorax ovate. The last thoracic segment asymmetrical, the right side is more produced posteriorly and pointed at the apex.

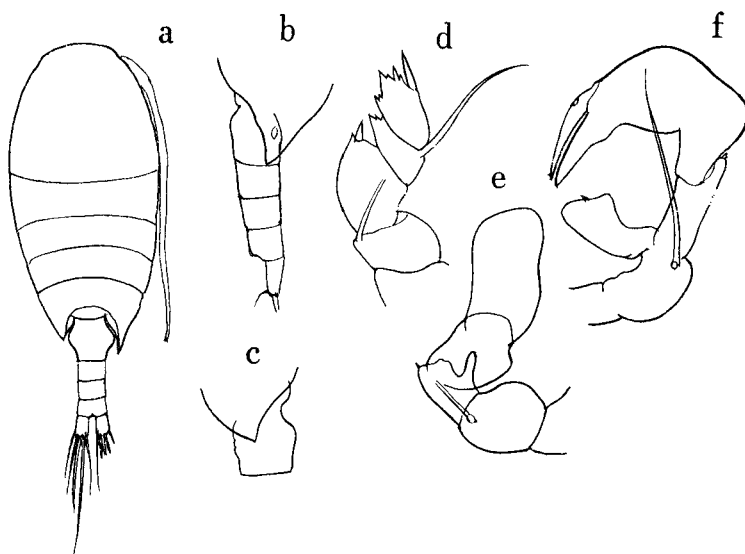


Fig. 224. *Phyllopus impar* FARRAN.

Female: a, dorsal aspect: b, last thoracic segment and abdomen, lateral aspect, right side; c, last thoracic segment, lateral aspect, left side; d, 5th leg. Male: e, right 5th leg; f, left 5th leg.

The abdominal segment and furca are in the proportional lengths as 35:17:14:18:16=100. The genital segment inflated on each side of the lateral margin and slightly asymmetrical; the right side is more remarkable. The furcal rami 1.6 times as long as wide.

The 1st antenna extends about to the end of the last thoracic segment. The mouth parts and swimming legs as those of the preceding species.

In the 5th pair of legs the serration of the distal segment differs in shape from that of the foregoing species as shown in the figure.

*Male.* Length, 2.91 mm : cephalothorax, 2.01 mm ; abdomen, 0.90 mm. The last thoracic segment symmetrical, not pointed at the lateral distal margin.

The 1st antenna extends about to the distal margin of the thoracic segment.

The 5th pair of legs resembles that of *helgae* in general appearance but the distal segment of the left leg differs in shape from that of *helgae*; in *helgae* the tooth of the distal segment is distinctly separated from the distal segment but in *impar* there is no distinct demarcation between the tooth and the segment; the outer marginal claw is straight as figured by Sars; the lamellous plate on the inner margin of the 2nd segment is narrow and has a small denticle on the distal margin. In the right leg the process on the inner proximal margin of the 3rd segment is slender and long.

*Remarks.* There appear to exist some confusions regarding the identification of the male of *P. impar* FARRAN. In the original description of *impar* given by FARRAN he states "The animal in general appearance, and in most of its appendages resembled the male of *P. helgae* referred to above. It was, however, rather larger, and showed some differences in the form of the 5th feet, the wing on the first joint of the left leg being considerably smaller, and the terminal hook of the same foot shorter and more curve". In 1925 Sars described and figured the same species. He states "La patte gauche est de beaucoup la plus puissante, et se termine en une pince très rameassée, avec le propode fortement gonflé. En dedans du segment basilaire de cette patte est attaché un appendice lamelliforme un peu courbé et largement tronqué bout, représentant évidemment la rame interne". Sars figured the claw on the distal outer margin of the terminal segment of the left 5th leg as long and straight. According to A. Scott the terminal joint of the exopod of the left 5th leg has the outer margin distinctly angled at the middle. The outer distal curved spine on this joint is proportionally shorter than in the male of *iadentatus* or *helgae*. Sars' male specimen of *impar* differs slightly from those given by FARRAN or A. Scott in the structure of the left 5th leg. The female specimen of *impar* resembles *bidentatus* in the asymmetry of the last thoracic segment but the shape of the genital segment is different from that of *bidentatus* and is near to that of *helgae* in the shape of the lateral swelling. In the male of *helgae* the 2nd basal segment has a of the left 5th leg lamellous wing furnished with a small process on the distal margin; this process is observed in the male of *impar* figured by Sars, but absent in A. Scott's figure. The outer marginal claw on the terminal segment of the left 5th leg is rather straight and long in *helgae*, whereas, that of *bidentatus* is curved and short; Sars' specimen of *impar* comes near to *helgae* in having a straight and long claw.

*Occurrence.* 5 females and 3 males from the deep water of the Izu region.

*Distribution.* The species has been recorded from the Atlantic and Malay Archipelago.

*Phyllopus helgae* FARRAN.

(Fig. 225, a-f)

*Phyllopus helgae*, FARRAN, 1908, p. 83, pl. ix, figs. 5, 6; A. SCOTT, 1909, p. 148; SARS, 1909, p. 148; SARS, 1925, p. 342, pl. cxxiv, figs. 1-6; TANAKA, 1937, p. 270, fig. 19, a-e; BRODSKY, 1950, p. 400, text-fig. 285:

*Female*. Length, 2.37 mm: cephalothorax, 1.64 mm; abdomen, 0.73 mm. The last thoracic segment symmetrical, bluntly produced when viewed from the lateral.

The abdominal segments and furca are in the proportional lengths as 40:14:14:18:14=100. The genital segment asymmetrical, the right lateral

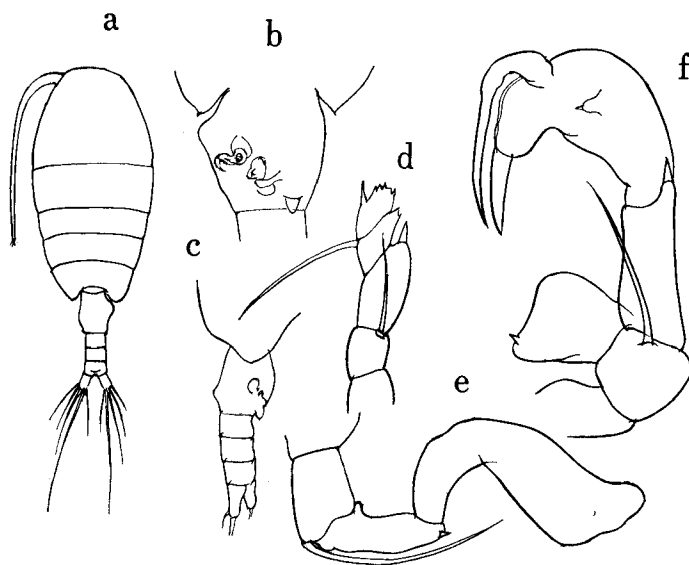


Fig. 225. *Phyllopus helgae* FARRAN.

Female: a, dorsal aspect; b, genital segment, ventral aspect; c, last thoracic segment and abdomen, lateral aspect, right side; d, 5th leg. Male: e, right 5th leg; f, left 5th leg.

margin is much produced; the genital area is furnished with 2 irregular lamellous plates; the distal ventral margin of the segment has a triangular process on the left side. The furcal rami 1.5 times as long as wide.

The 1st antenna extends to the posterior margin of the 3rd thoracic segment. The mouth parts and swimming legs as described and figured by previous authors.

*Male*. Length, 2.29 mm: cephalothorax, 1.52 mm; abdomen, 0.77 mm. The last thoracic segment slightly asymmetrical; the lateral corner triangularly produced with a small process on the distal margin; in some specimens the

lateral margin has 2 small processes.

In the 5th pair of legs the distal segment of the left leg is elongated and curved. The right leg has a very small process on the inner proximal margin of the 3rd segment; the distal segment is long and spoon-shaped.

*Occurrence.* The species is most frequent among the members of the genus.

*Distribution.* The species has been recorded from the Atlantic, Malay Archipelago, Pacific coast of Middle Japan and far-eastern and polar seas of the USSR.

*Phyllopus mutatus* sp. nov.

(Fig. 226, a-e)

*Female.* Length, 2.69 mm: cephalothorax, 1.88 mm; abdomen, 0.81 mm. The

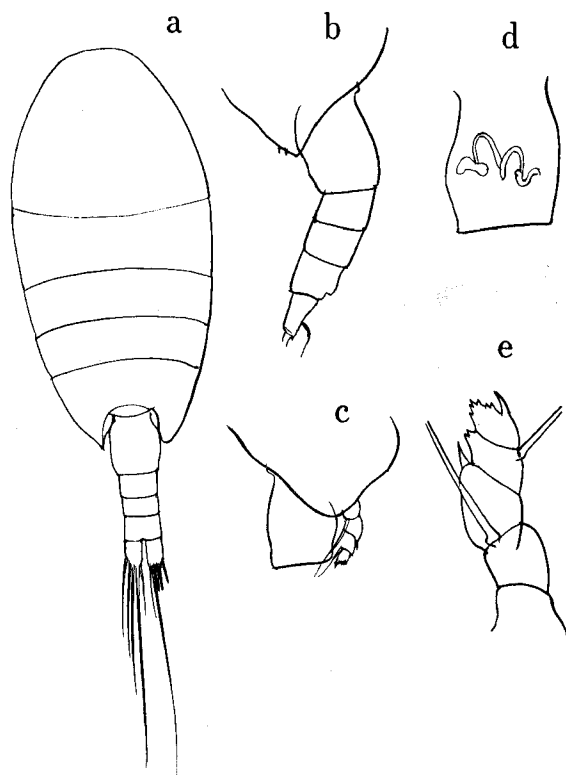


Fig. 226. *Phyllopus mutatus* sp. nov.

Female: a, dorsal aspect; b, last thoracic segment and abdomen, lateral aspect, left side; c, last thoracic segment, lateral aspect, right side; d, genital segment, ventral aspect; e, 5th leg.

last thoracic segment asymmetrical; the left side is more produced posteriorly with a point at the apex, and has 2 minute spinules on the postero-ventral margin; the right side is narrowly rounded.

The abdominal segments and furca are in the proportional lengths as 48:13:13:18:18=100. The genital segment asymmetrical; the lateral margin of the right side is more swollen about the middle; no protuberances on the ventral surface. The furcal rami 1.6 times as long as wide.

The 1st antenna 24-jointed, reaches back to the distal margin of the thoracic segment when fully extended. The mouth parts and swimming legs as those of *P. bidentatus*.

The 5th pair of legs resembles that of *bidentatus*; they are asymmetrical, the left leg is slightly longer than the right.

*Remark.* The present species comes closely to *P. helgae* FARRAN but differs from it in the shape of the genital segment, the absence of the protuberance on the ventral surface of the same segment, and in the asymmetry of the last thoracic segment. The specimen comes near to *P. integer* ESTERLY in the structure of the 5th pair of legs. But *integer* has a symmetrical last thoracic segment and is larger in size (3.54 mm in the female; 2.64 mm in the male).

*Occurrence.* 2 females from Suruga in the vertical hauls from depths 1000-400 m and 600-400 m, November 1938.

*Distribution.* The Pacific coast of Middle Japan.

#### Genus *Paramisophria* T. SCOTT.

The genus is represented by a single species, *Paramisophria cluthae* T. SCOTT. SARS (1925) recorded the species from the Mediterranean. No examples have been recorded from the Indian and Pacific Oceans.

#### Genus *Scottula* SARS.

In 1903 SARS created the genus *Scottula* to accomodate a species, *Scottula inaequicornis* taken from the Norwegian coast. He described the second species, *S. abyssalis* SARS collected near Azores. Up to the present time any of the species have not been obtained from the Izu region.

#### Family PSEUDOCYCLOPIDAE

#### Genus *Pseudocylops* BRADY.

SEWELL recorded the coccurrence of *Pseudocylops obtusatus* BRADY and ROBERTSON and *P. simplex* SEWELL from the Indian seas. The former species has a wide distribution, and has been recorded from the Atlantic and the

Norwegian coast, also from the Arabian Sea. None of these species have up to the present time been found from the Izu region.

#### Genus *Suezia* GURNEY.

The species is closely related to *Pseudocylops*. A single species *Suezia canalis* GURNEY has been recorded from the Suez Canal. SEWELL failed to find the species from the Indian seas. No examples have been taken from the Izu region.

### Family CANDACIIDAE

#### Genus *Candacia* DANA.

A. SCOTT recorded the occurrence of twelve species of the genus from the Malay Archipelago, namely *Candacia aethiopica* (DANA), *C. bipinnata* (GIESBRECHT), *C. bispinosa* (CLAUS), *C. bradyi* A. SCOTT, *C. catula* (GIESBRECHT), *C. curta* (DANA), *C. discaudata* A. SCOTT, *C. pachydactyla* (DANA), *C. simplex* (GIESBRECHT), *C. truncata* (DANA), *C. longimana* (CLAUS) and *C. tenuimana* (GIESBRECHT). SEWELL (1932) recorded from the Indian seas nine species out of the above twelve species and further recorded *C. norvegica* BOECK, *C. varicans* (GIESBRECHT) and *C. magna* SEWELL. He recorded *C. bipinnata*, *C. pachydactyla*, *C. curta*, *C. aethiopica*, and *C. bispinosa* from the Arabian Sea. BRODSKY recorded the occurrence of *C. columbiae* CAMPBELL, *C. parafalcifera* BRODSKY, *C. bipinnata* from the far-eastern and polar seas of the USSR. *C. pacifica* MORI is identical with *C. columbiae* which has been recorded from the northern waters of Japan. From the Izu region eleven species have been obtained of which a species, *C. grandis*, appears to be undescribed.

#### *Candacia bipinnata* GIESBRECHT.

*Candacia bipinnata*, GIESBRECHT, 1892, p. 424, t. 22, fig. 20; t. 39, figs. 27, 29; ESTERLY, 1905, p. 195; A. SCOTT, 1909, p. 151; SATO, 1913, p. 40; SARS, 1925, p. 351; FARRAN, 1929, p. 272; TANAKA, 1935, p. 272; MORI, 1937, p. 86, pl. 58, figs. 6-12; SEWELL, 1947, p. 246; BRODSKY, 1950, p. 405, text-fig. 289; GRICE, 1963, p. 174.

*Length.* Female 2.59 mm; male, 2.48 mm.

*Occurrence.* Common in the surface layer.

*Distribution.* The tropical and sub-tropical regions of the Pacific, Atlantic Oceans, Malay Archipelago and warm waters of Japan.

*Candacia pachydactyla* DANA.

*Candacia pachydactyla*, GIESBRECHT, 1892, p. 424, t. 21, 22, 39; A. SCOTT, 1909, p. 153; WOLFENDEN, 1911, p. 368; SARS, 1925, p. 230; FARRAN, 1929, p. 272; TANAKA, 1935, p. 211; MORI, 1937, p. 85, pl. 58 figs. 1-5; SEWELL, 1947, p. 247; GRICE, 1963, p. 178.

*Length.* Female, 2.95 mm; male, 2.91 mm.

*Occurrence.* Common in the surface layer.

*Distribution.* The tropical and sub-tropical regions of the Pacific, Atlantic and Indian Oceans, Malay Archipelago and adjacent seas of Japan.

*Candacia curta* DANA.

*Candacia curta*, GIESBRECHT, 1892, p. 424, t. 21, 22, 39; ESTERLY, 1905, p. 196; A. SCOTT, 1909, p. 152; WOLFENDEN, 1911, p. 357; SARS, 1925, p. 351; FARRAN, 1929, p. 272; MORI, 1932, p. 170 pl. figs. 1-8; pl. 57, figs. 1-5; FARRAN, 1936, p. 114; SEWELL, 1947, p. 246; GRICE, 1962, p. 175.

*Length.* Female, 2.40 mm; male, 2.54 mm.

*Occurrence.* Rather rare in the Izu region.

*Distribution.* The tropical and sub-tropical regions of the Pacific, Atlantic and Indian Oceans, Malay Archipelago, Great Barrier Reef, Arabian Sea and the warm waters surrounding Japan.

*Candacia aethiopica* DANA.

*Candacia aethiopica*, GIESBRECHT, 1892, p. 424, t. 21, 22, 39; ESTERLY, 1905, p. 196; A. SCOTT, 1909, p. 151; SARS, 1925, p. 350; FARRAN, 1929, p. 537; SEWELL, 1932, p. 334; TANAKA, 1935, p. 212; FARRAN, 1936, p. 115; MORI, 1937, p. 85, pl. 57 figs. 6-10; SEWELL, 1947, p. 245; GRICE, 1963, p. 176.

*Length.* Female, 2.57 mm; male, 2.43 mm.

*Occurrence.* Common in the surface layer.

*Distribution.* The tropical and sub-tropical regions of the Pacific, Atlantic and Indian Oceans, Malay Archipelago, Great Barrier Reef, Arabian Sea and the warm waters surrounding Japan.

*Candacia bradyi* A. SCOTT.

*Candacia bradyi*, A. SCOTT, 1909, p. 156, pl. xlvii (male); SEWELL, 1914, p. 229; *Candacia curva*, MORI, 1932, p. 171, pl. iii (female); *C. bradyi*, TANAKA, 1935, p. 212; MORI, 1937, p. 80, pl. 53, figs. 8-12; GRICE, 1963, p. 174.

*Length.* Female, 1.93 mm; male, 2.09 mm.

*Occurrence.* Rare in the Izu region.

*Distribution.* The Malay Archipelago, Indian seas and warm waters surrounding Japan.

*Candacia catula* GIESBRECHT.

*Candacia catula*, GIESBRECHT, 1892, p. 424, t. 21, 22, 39; A. SCOTT, 1909, p. 152; SEWELL, 1932, p. 385; TANAKA, 1935, p. 213; FARRAN, 1936, p. 115; MORI, 1937, p. 81, pl. 54 figs. 8-12; GRICE, 1963, p. 175.

*Length.* Female, 1.35-1.48 mm; male, 1.32-1.48 mm.

*Occurrence.* Very common in the surface layer of the Izu region in summer time.

*Distribution.* The Indian Ocean, Malay Archipelago, Great Barrier Reef and the warm waters surrounding Japan.

*Candacia truncata* DANA.

*Candacia truncata*, GIESBRECHT, 1892, p. 424, t. 21, 22, 39; A. SCOTT, 1909, p. 155; SEWELL, 1932, p. 338; TANAKA, 1935, p. 214; FARRAN, 1936, p. 115; MORI, 1937, p. 82, pl. 55, figs. 1-6; *Paracandacia truncata*, GRICE, 1963, p. 173.

*Length.* Female, 2.02-2.23 mm; male, 2.15 mm.

*Occurrence.* Common in the surface layer.

*Distribution.* Indian Ocean, Malay Archipelago, Great Barrier Reef, and the warm waters surrounding Japan.

*Candacia bispinosa* CLAUS.

*Candacia bispinosa*, GIESBRECHT, 1892, p. 424, t. 21w, 22, 39; A. SCOTT, 1909, p. 151; WOLFENDEN, 1911; 357; SARS, 1925, p. 352; FARRAN, 1929, p. 272; SEWELL, 1932, p. 334; TANAKA, 1935, p. 214; FARRAN, 1936, p. 114; MORI, 1937, p. 84, pl. 56 figs. 9-14; SEWELL, 1947, p. 246; *Paracandacia bispinosa*, GRICE, 1963, p. 173.

*Length.* Female, 1.79 mm; male, 1.36 mm.

*Occurrence.* Very rare in the Izu region.

*Distribution.* The tropical region of the Pacific, Atlantic and Indian Oceans, Malay Archipelago, Great Barrier Reef, and the warm waters of Japan.

*Candacia longimana* CLAUS.

(Fig. 227, a-e)

*Candacia longimana*, GIESBRECHT, 1892, p. 423, t. 21, figs. 5, 18; t. 22, figs. 5, 7, 15, 26, 34, 36; t. 39, figs. 4-6, 18, 19; A. SCOTT, 1909, p. 153; SARS, 1925, p. 349; FARRAN, 1929, p. 280; 1936, p. 115; MORI, 1937, p. 79, pl. 53 figs. 1-7. SEWELL, 1947, p. 247, GRICE, 1963, p. 177.

*Female.* Length, 3.00 mm. The abdomen is contained 3.8 times in the length of the cephalothorax. The abdominal segments and furca are in the proportional length as 48:26:6:20=100. The genital segment is onion-shaped in dorsal aspect.



The 1st antenna reaches back to the end of the thoracic segment. The 5th pair of legs just as figured by GIESBRECHT.

*Male.* Length, 2.94 mm. The specimen, though smaller in size than that recorded from the Mediterranean, agrees well with the description and figures given by GIESBRECHT.

*Occurrence.* 4 females and 3 males from the Izu region in vertical hauls from 200-0 m.

*Distribution.* The species has been recorded from the temperate regions

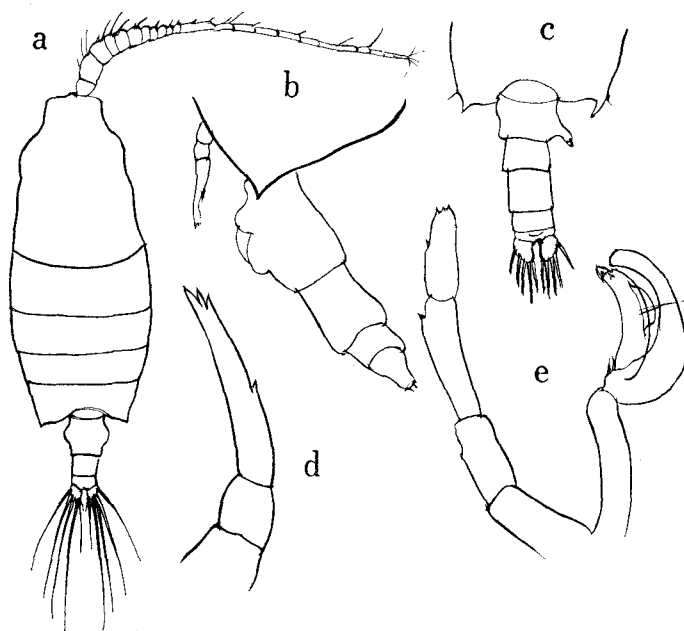


Fig. 227. *Candacia longimana* (CLAUS).

Female: a, dorsal aspect; b, last thoracic segment and abdomen, lateral aspect; d, 5th leg. Male: c, last thoracic segment and abdomen, dorsal aspect; e, 5th pair of legs.

of the Atlantic and Pacific, Mediterranean, Malay Archipelago, Great Barrier Reef, and the neighbouring waters of Japan.

### *Candacia norvegica* BOECK.

(Fig. 228, a-h)

*Candacia norvegica*, GIESBRECHT and SCHMEIL, p. 131; SARS, 1903, p. 134, pls. lxxxix, xc; VAN BREEMEN, 1908, p. 147 fig. 165; SEWELL, 1932, p. 336, text-fig. 110; JESPERSEN, 1934, p. 119; GRICE, 1953, p. 178.

*Female.* Length, 3.63: cephalothorax, 2.81 mm; abdomen, 0.82 mm. The cephalothorax about 3 times as long as wide. The lateral corner of the last thoracic segment produced into an acute process extending about to the middle of the genital segment.

The abdominal segments and furca are in the proportional lengths as  $52:17:9:22=100$ . The genital segment is armed with a small process on each

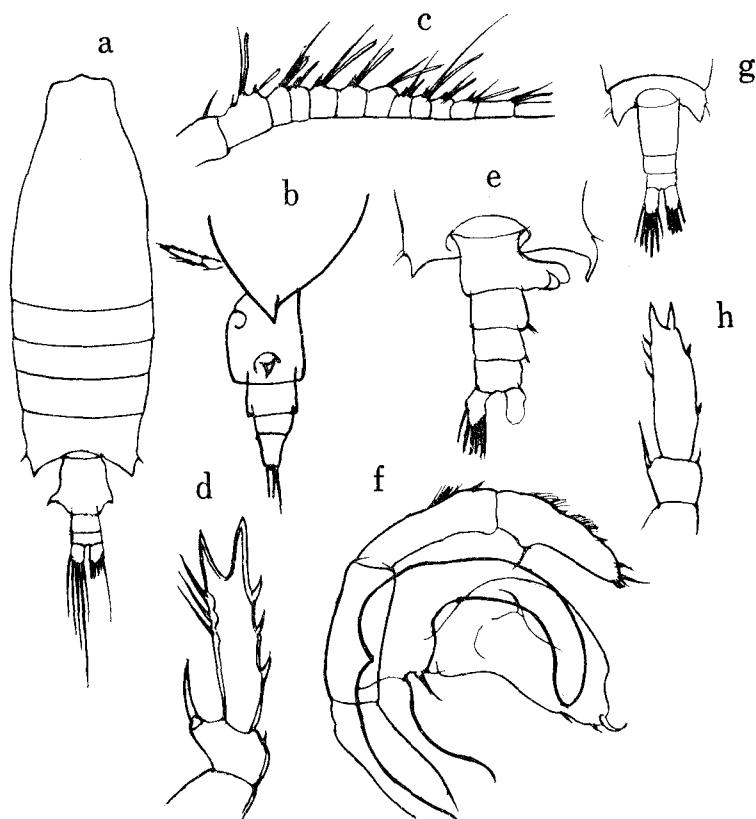


Fig. 228. *Candacia norvegica* BOECK.

Female: a, dorsal aspect; b, last thoracic segment and abdomen, lateral aspect; d, 5th leg. Male: e, last thoracic segment and abdomen, dorsal aspect; f, 5th pair of legs. Female, juv.: g, last thoracic segment and abdomen, dorsal aspect; h, 5th leg.

side of the lateral margin; these spines are reported to be equal in sinze by SARS or WILSON but in my specimen the spine on the left side is longer than that of the right. In other respects the specimen agrees quite well with the decription and figures given by SARS, though there is a slight difference in the armature of the 5th pair of legs.

*Male.* Length, 3.25 mm: cephalothorax, 2.50 mm; abdomen, 0.75 mm. The 2nd, 3rd and 4th abdominal segments have each a tuft of hairs on the right distal corner. In the 5th pair of legs the distal segment of the exopod of the right leg more voluminous than that figured by Sars. The distal segment of the left leg has a spine on the inner proximal margin.

*Immature female.* Length, 2.50 mm. The genital segment has no lateral spines. The 5th pair of legs has only 2 outer marginal spines.

*Remarks.* The present specimen comes nearer to the type form of *norvegica* than to *C. norvegica* var. *tropica* described by SEWELL in its large size, in having 3 outer marginal spines on the distal segment of the 5th leg, and in having a spine on the outer distal margin, which is longer than that of the inner distal margin of the same leg; the inner marginal spine of the 2nd basal segment of the 5th leg is very strong in the present specimen, whereas, it is slender in SEWELL's specimen. In var. *tropica* the distal segment of the 5th leg has only 2 outer marginal spines, and the outer marginal seta of the 2nd basal segment of the 5th leg is not so small as that of the present specimen. The present specimen differs from the type form of *norvegica* in the shape of the female genital segment and in the position of the spine on the outer margin of the female 5th leg. The specimen might well be regarded as a variety of *C. norvegica* to which I propose var. *intermedia*.

*Occurrence.* Common in the deep water of the Izu region.

*Distribution.* Recorded from the Norwegian Sea, Woods Hole region, Gulf of Maine, coast of Greenland, temperate Atlantic and Indian seas.

### *Candacia grandis* sp. nov.

(Fig. 229, a-j)

*Female.* Length, 5.13 mm: cephalothorax, 4.07 mm; abdomen, 1.06 mm. The abdomen is contained 3.4 times in the length of the cephalothorax. The last thoracic segment symmetrical; the posterior lateral corner of the segment produced into an acute expansion. The posterior margin of the head has a small swelling on the mid-dorsal line.

The abdomen 3-jointed, the segments and furca are in the proportional lengths as 47:22:17:14=100. The genital segment symmetrical, produced below. The furcal rami as long as wide.

The 1st antenna 24-jointed, extends beyond the end of the furca by distal 2 segments; the segments are in the following proportional lengths:

Segment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	43	80	25	22	25	28	25	25	22	25	28	40	50	53	59	65
	17	18	19	20	21	22	23	24-25								
	65	62	59	53	31	28	34	58	=1000							

The mouth parts as those of *C. longimana* CLAUS.

The 1st leg has an inner marginal seta on the 2nd basal segment. The 3rd leg has a short curved spine on the 3rd segment of the exopod.

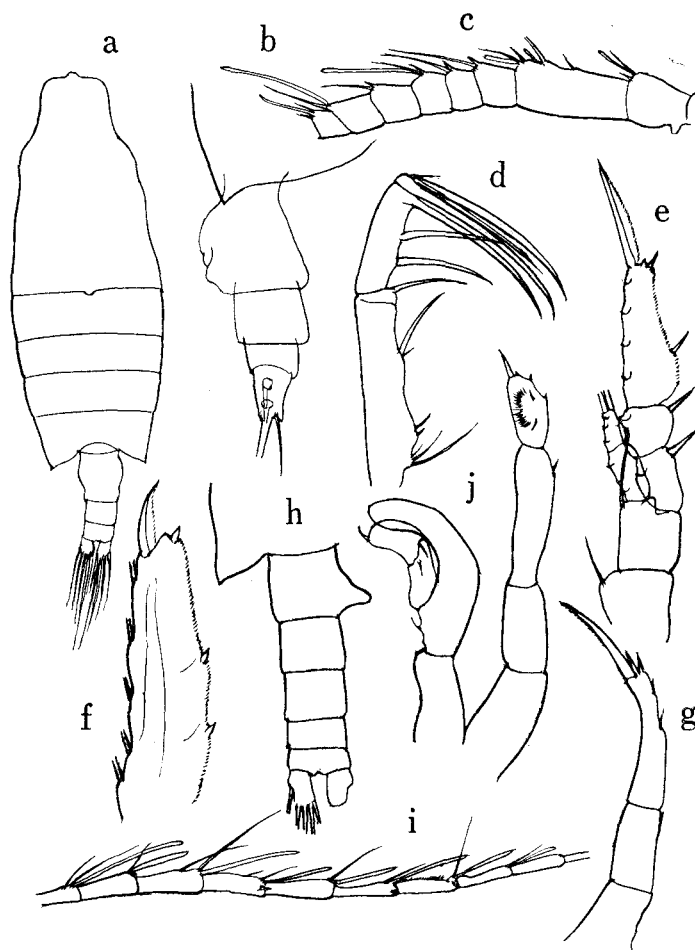


Fig. 229. *Candacia grandis* sp. nov.

Female: a, dorsal aspect; b, last thoracic segment and abdomen, lateral aspect; c, 1st antenna, proximal part; d, 2nd maxilla; e, 1st leg; f, distal joint of exopod of 3rd leg; g, 5th leg. Male: h, abdomen, dorsal aspect; i, middle portion of clasp antenna; j, 5th pair of legs.

The 5th pair of legs symmetrical, 3-jointed; the terminal segment has 2 small outer marginal spines and 3 apical spines of which the inner marginal one is long.

*Male.* Length, 4.37 mm: cephalothorax, 3.31 mm; abdomen, 1.06 mm. The

general appearance as in the female. The abdominal segments and furca are in the proportional length as  $26:21:20:11:7:15=100$ . The genital segment has a strong process on the right lateral margin.

The 1st antenna slender and long, reaching the end of the furca; the right antenna resembles that of *C. longimana* but the segment 17 separates from the 18th, and so are the segment 19 from the 20th; the segment 18 is finely denticulated on the anterior margin; the segment 19 denticulated only on the proximal anterior margin; the segment 15 has a short distal spine.

The 5th pair of legs resembles that of *C. longimana*.

*Remarks.* The present specimen closely allied to *C. longimana*, *C. falcifer* FARRAN and *C. magna* SEWELL but differs from either of them in the structure of the female 5th leg and the shape of the 1st abdominal segment of the male.

*Occurrence.* One female and a male from Suruga from depths 1000-0 m.

*Distribution.* The Pacific coast of Middle Japan.

## Family PONTELLIDAE

### Genus *Calanopia* DANA.

A. SCOTT recorded the occurrence of six species from the Malay Archipelago, namely, *Calanopia elliptica* (DANA), *C. minor* A. SCOTT, *C. thompsoni* A. SCOTT, *C. herdmani* A. SCOTT, *C. americana* DAHL and *C. aurivillii* CLEVE. SEWELL (1932) recorded the following species from the Indian seas: *C. aurivillii*, *C. elliptica*, *C. herdmani*, *C. minor* and *C. thompsoni*. FARRAN recognized *C. elliptica* and *C. aurivillii* from the Great Barrier Sea. SEWELL (1947) confirmed the presence of *C. elliptica* in the Arabian Sea. From Japan MORI recorded *C. elliptica* and *C. thompsoni*. From the Izu region *C. elliptica* and *C. minor* were detected.

### *Calanopia elliptica* (DANA).

*Calanopia elliptica*, GIESBRECHT, 1892, p. 441, t. 31, figs. 23-26; 31, 32; t. 38, figs. 42, 47; A. SCOTT, 1909, p. 176, pl. xlviii, figs. 1-5; SEWELL, 1932, p. 341; FARRAN, 1936, p. 115; MORI, 1937, p. 89, pl. 40, figs. 3-8.

*Female.* Length, 1.86 mm; cephalothorax, 1.29 mm; abdomen, 0.57 mm. The cephalothorax elliptical. The head separates from the 1st thoracic segment. The last thoracic segment produced posteriorly on each side into an acute spine.

The abdomen 2-jointed, the segments and furca are in the proportional lengths as  $41:31:28=100$ . The furcal rami 4.5 times as long as wide.

The 1st antenna extends to the middle of the genital segment. The 5th

pair of legs 4-jointed, asymmetrical; the terminal segment of the left leg is longer than that of the right.

*Male.* Length, 1.84 mm: cephalothorax, 1.25 mm; abdomen, 0.59 mm. The lateral spine of the last thoracic segment asymmetrical. The 2nd abdominal segment has a small process on the right distal corner.

The 5th pair of legs just as figured by GIESBRECHT.

*Occurrence.* 4 females and 3 males from Sagami in vertical hauls 500-0 m

*Distribution.* Recorded from the warm regions of the Pacific and Indian Oceans, Malay Archipelago, Suez Canal, Great Barrier Reef and the warm regions of the adjacent seas of Japan.

*Calanopia minor* A. SCOTT.

(Fig. 230, a-f)

*Calanopia minor*, THOMPSON and SCOTT, 1903, p. 251; A. SCOTT, 1909, p. 177, pl. xlviii, figs. 6-10; SEWELL, 1932, p. 342,

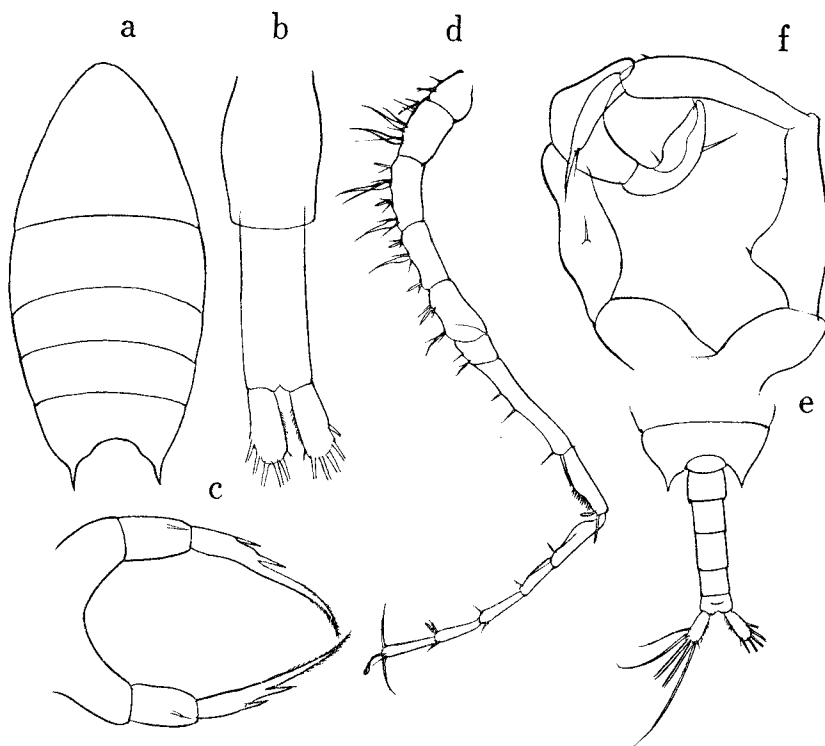


Fig. 230. *Calanopia minor* A. SCOTT.

Female: a, cephalothorax, dorsal aspect; b, abdomen, dorsal aspect; c, 5th pair of legs. Male: d, clapping antenna; e, last thoracic segment and abdomen, dorsal aspect; f, 5th pair of legs.

*Female.* Length, 1.27 mm: cephalothorax, 0.84; abdomen, 0.43 mm. The cephalothorax ovate. The last thoracic segment produced on each side into an acute spine. The rostrum pointed.

The abdominal segments and furca are in the proposional lengths as 37:44:19=100. The furcal rami about 2.2 times as long as wide.

The 1st antenna 17-jointed, extends to the end of the cephalothorax. The 1st to 4th legs stout, with 3-jointed exopod and 2-jointed endopod. The 5th leg 3-jointed; the distal segment has a long inner seta which is not stout as in *C. elliptica* figured by A. SCOTT.

*Male.* Length, 1.23 mm. The abdomen is contained about 1.9 times in the length of the cephalothorax. The proportional lengths of the abdominal segments and furca are as 17:19:19:15:11:19=100. The furcal rami 3 times as long as wide.

The left 1st antenna extends to the end of the 3rd thoracic segment; the right side is modified into a grasping organ and has moderately stout denticles on the 18th segment; the 20th and 21st segments are separated.

The 5th pair of legs agrees well with A. SCOTT's figure.

*Occurrence.* One adult female in vertical hauls from 200-0 m, and a male in hauls from 500-0 m in the Izu region.

*Distribution.* The species has been recorded from the Malay Archipelago, Indian seas, Maldiva and Laccadive Archipelagoes, the Pearl Bank of Ceylon and the Arabian Sea.

### Genus *Labidocera* LUBBOCK.

A. SCOTT recorded the occurrence of the following species from the Malay Archipelago, namely, *L. acuta* (DANA), *L. detruncata* (DANA), *L. kröyeri* (BRADY), *L. laevidentata* (BRADY), *L. minuta* GIESBRECHT, *L. bataviae* A. SCOTT, and *L. madurae* A. SCOTT. SEWELL recorded, beside the species listed above, two forms of *L. euchaeta*, four varieties of *L. kröyeri*, *L. pavo* GIESBRECHT, and *L. pectinata* THOMPSON and A. SCOTT. He (1947) recorded the occurrence of *L. acuta*, *L. acutifrons* (DANA) *L. detruncata* and *L. minuta* from the Arabian Sea. BRODSKY found the following species from the far-eastern and polar seas of the USSR: *L. pavo*, *L. bipinnata* TANAKA and *L. japonica* MORI. MORI, (1937) recorded from the neighbouring waters of Japan eight species, namely, *L. acuta*, *L. pavo*, *L. kröyeri*, *L. euchaeta*, *L. japonica* MORI, *L. bipinnata* *L. rotundata* MORI. I found in my collections *L. acutifrons*, *L. acuta*, *L. detruncata*, *L. pavo*, *L. kröyeri*, *L. minuta*, *L. japonica* and *L. bipinnata*.

*Labidocera acutifrons* (DANA).

(Fig. 231, a-f)

*Labidocera acutifrons*, GIESBRECHT, 1892, p. 445, t. 23, 41; FARRAN, 1929, p. 274; WILSON, p. 145; FARRAN, 1936, p. 116; WILSON, 1950, p. 242.

*Female*. Length, 3.75 mm. The head has a median crest but no lateral hooks. The last thoracic segment symmetrical, produced on each side into a

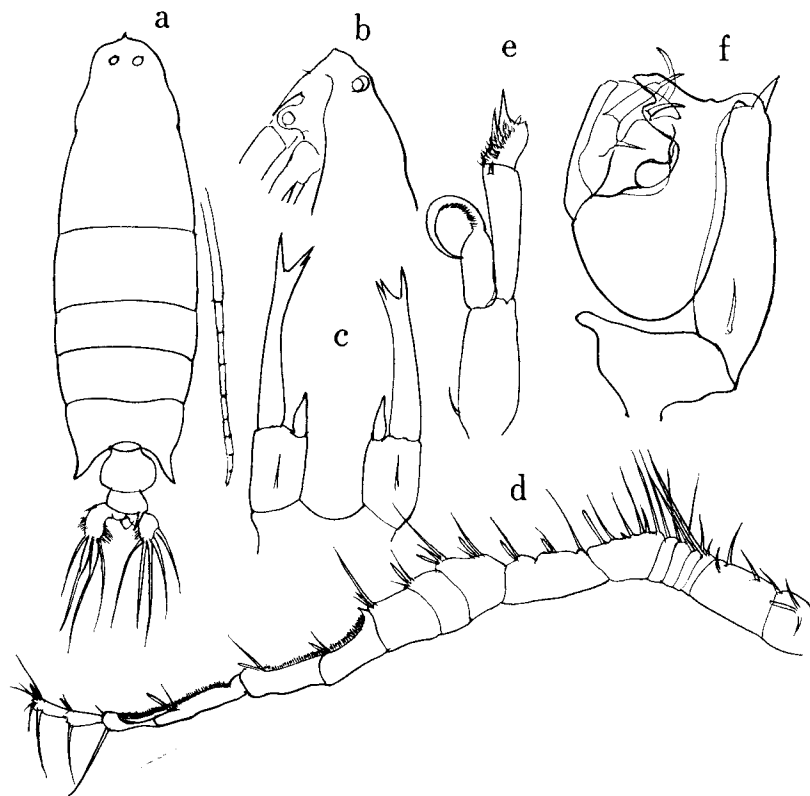


Fig. 231. *Labidocera acutifrons* (DANA).

Female: a, dorsal aspect; b, head lateral aspect; c, 5th pair of legs. Male: d, clasper antenna; e, left 5th leg f, right 5th leg.

wing-like process. The abdomen 3-jointed; the genital segment onion-shaped; the 2nd segment has a long spine on the right distal corner when viewed from the dorsal; the anal segment has a long covering. The furcal rami asymmetrical; the left side is larger than the right; the furcal setae of the left ramus wider at the proximal. The 1st antenna extends to the end of the genital segment. The 5th pair of legs asymmetrical; the exopod of the right leg is longer than that of the left.



*Male.* Length, 3.38 mm. The last thoracic segment symmetrical, produced into a spiniform projection on each side. The abdomen 5-jointed, symmetrical; the segments are in the following proportional lengths as 19:18:22:9:6:26=100. The grasping antenna has each a serrated upper margin on the segments 18 and 19-20-21. The right 5th leg as shown in the figure; the left leg has a rudimentary endopod.

*Occurrence.* The species is very rare in the Izu region; only one female and a male were obtained from the surface layer.

*Distribution.* The species is widely distributed in the warm regions of the Pacific, Atlantic and Indian Oceans, also in the Mediterranean Sea.

*Labidocera acuta* (DANA).

*Labidocera acuta*, GIESBRECHT, 1892, p. 445, t. 23, 25, 41; A. SCOTT, 1909, p. 164; SEWELL, 1932, p. 351; FARRAN, 1936, p. 116; MORI, 1937, p. 91, pl. 41, figs. 1-5; WILSON, 1950, p. 241.

*Female.* Length, 3.0-3.3 mm. The head has no side hooks. An acute median crest extends anteriorly on the forehead. The last thoracic segment produced laterally into a sharp process on each side. The abdomen 3-jointed. The genital segment bears a spine on the lateral distal corner. The 5th pair of legs symmetrical; the exopod has 3 unequal spines at the apex and 3 outer marginal spines; the endopod is 1/4 the length of the exopod and ends in 2 unequal spines.

*Male.* Length, 2.73-2.94 mm. The last thoracic segment asymmetrical; the left side has a curved spine. The abdomen 5-jointed; the proportional lengths of the segments and furca are as 20:20:22:13:5:20=100; the 1st segment has a curved spine on the ventral distal corner. The grasping antenna has each a serrated upper margin on the segments 18 and 19-20; the upper distal margin of the 22nd segment produced into a strong spine. The right 5th leg has a long 2nd basal segment; the thumb-like process on the 1st segment of the exopod small; the palm is rounded in shape; the claw-like segment is short and broad. In the left leg the distal segment of the exopod is long and has 3 long spines on the apical portion.

*Occurrence.* Very common in summer and autumn seasons in the surface layer.

*Distribution.* The species has a wide distribution in the warm regions of the Pacific, Atlantic and Indian Oceans.

*Labidocera detruncata* (DANA).

*Labidocera detruncata*, GIESBRECHT, 1892, p. 44, t. 23, 25, 41; A. SCOTT, 1909, p. 165; SEWELL, 1932, p. 359; MORI, 1937, p. 92, pl. 42, figs. 1-6; WILSON, 1950, p. 244, pl. 16, figs. 192-193.

*Female.* Length, 2.52-2.77 mm. The head has no side hooks; the anterior margin of the head rounded. The last thoracic segment symmetrical, ending on each side into a small point.

The abdomen 3-jointed; the genital segment has dorsal swellings; the anal segment has a long flap. The furcal rami broad.

The 5th pair of legs symmetrical; the exopod has 3 outer marginal spines and an inner marginal one close to the base of the apical spine; the endopod consists of a large conical spine extending about to the middle of the exopod.

*Male.* Length, 2.36-2.53 mm. The grasping antenna has each a serrated upper margin on the segments 17, 18 and 19-20-21.

In the 5th pair of legs the 1st joint of the exopod of the right leg has a strong thumb-like process; the claw-like segment is slender. The left leg has 4 spines on the distal segment of the exopod.

*Occurrence.* The species is fairly common in summer time.

*Distribution.* The species has been recorded from the warm regions of the Pacific Ocean, Malay Archipelago, Maldives and Laccadive Archipelagos.

### *Labidocera pavo* GIESBRECHT.

*Labidocera pavo*, GIESBRECHT, 1892, p. 446, t. 25, 41; GURNEY, 1927, p. 154; SEWELL, 1932, p. 365; MORI, 1937, p. 92, pl. 41, figs. 6-12; WILSON, 1950, p. 248, pl. 25, fig. 363.

*Female.* Length, 2.22-2.34 mm. The head has no side hooks. The last thoracic segment has an acute expansion laterally. The abdomen 2-jointed; the genital segment has a large process on the right lateral margin. The furcal rami symmetrical, broad.

The 1st antenna extends to the end of the genital segment. In the 5th pair of legs the exopod has 3 apical spines and 2 outer marginal ones; the endopod of the right leg is somewhat small in size than that of the left.

*Male.* Length, 1.70-1.92 mm. The thumb-like process on the 1st segment of the right 5th leg slender and long; the claw-like segment is long. In the left leg the distal segment of the exopod has 3 slender spines at the apical portion.

*Occurrence.* Fairly common in summer and autumn seasons.

*Distribution.* The species has been recorded from the Red Sea, East China Sea, Indian seas and Northwest Pacific.

### *Labidocera kröyeri* (BRADY).

(Fig. 232, a-f)

*Labidocera kröyeri*, GIESBRECHT, 1892, p. 446, t. 23, 25, 41; A. SCOTT, 1909, p. 165; SEWELL, 1932, p. 362; MORI 1937, p. 93, pl. 42, figs. 7-10; WILSON, 1950, p. 246.

*Female.* Length, 2.75 mm. The head is furnished with small lateral hooks. The last thoracic segment symmetrical; produced on each side into an acute spine. The abdomen consists of 3 segments; the genital and the following segments are equipped with several hooks and spines. The furcal rami nearly symmetrical.

The 1st antenna extends posteriorly to the end of the genital segment. The 5th pair of legs symmetrical; the exopod terminates into a strong curved

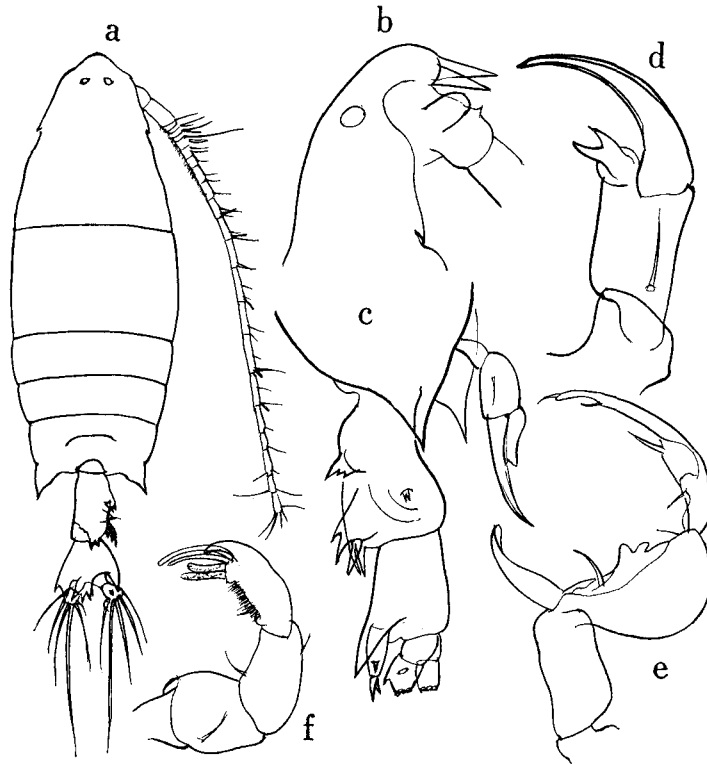


Fig. 232. *Labidocera kröyeri* (BRADY).

Female: a, dorsal aspect; b, head, lateral aspect; c, last thoracic segment and abdomen, lateral aspect; e, 5th leg. Male: e, right 5th leg; f, left 5th leg.

spine; the endopod 1-jointed, about half as long as the exopod, bifurcate at the apex.

*Male.* Length, 2.13-2.36 mm. The head has lateral hooks. The lateral process of the last thoracic segment bifurcate on the right side.

The abdominal segments and furca are in the proportional lengths as 25:18:25:7:5:18=100. The grasping antenna coarsely dentate on the upper margin of the 18th segment; the segments 19-20-21 are finely serrated on the

upper margin; the segment 22 has a large process on the distal upper margin.

In the 5th pair of legs the right leg has a long and curved thumb-like process on the 1st segment of the exopod; the distal segment of the exopod has beside a strong apical spine 4 aesthetasque-like filaments on the apical portion.

*Occurrence.* Rare in the Izu region, the female is rarer.

*Distribution.* The species has been recorded from Phillippine, Hongkong, Maldive and Laccadive Archipelagoes, Malay Archipelago, Indian seas and warm waters of Japan.

*Labidocera minuta* GIESBRECHT.

(Fig. 233, a-f)

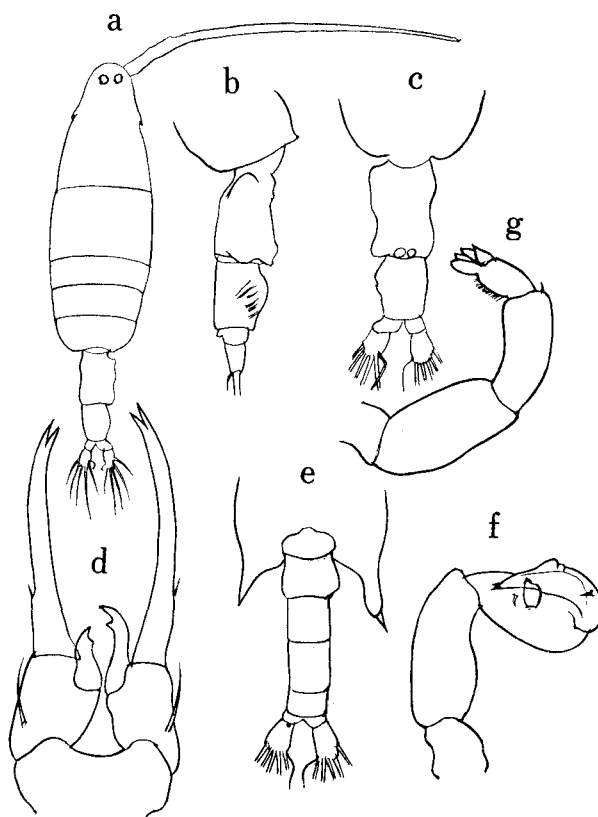


Fig. 233. *Labidocera minuta* GIESBRECHT.

Female: a, dorsal aspect; b, last thoracic segment and abdomen, lateral aspect, right side; c, abdomen, ventral aspect; d, 5th pair of legs. Male: e, last thoracic segment and abdomen, dorsal aspect; f, right 5th leg; g, left 5th leg.

*Labidocera minuta*, GIESBRECHT, 1892, p. 446, t. 23, 25, 41; A. SCOTT, 1909, p. 167; GURNEY, 1927, p. 154; SEWELL, 1932, p. 364; FARRAN, 1937, p. 116; WILSON, 1950, p. 247, pl. 24, figs. 356-359.

*Female*. Length, 1.96-2.16 mm. The head has small side hooks. The last thoracic segment asymmetrical; the right side produced into a small point; the left side bluntly rounded.

The abdomen 3-jointed of which the genital segment is the longest and produced rectangularly on the right margin; the 2nd segment has a low lateral swelling on the right side, furnished with chitinous tubercles; the anal segment asymmetrical, the right lateral margin outwardly produced.

The 5th pair of legs slightly asymmetrical; the exopod of the left leg is slightly longer, ends in 2 subequal spines; the outer margin of the exopod has 2 spinules; the endopod terminates into 2 apical spines.

*Male*. Length, 1.36-1.66 mm. The last thoracic segment asymmetrical; the right side produced into a long narrow process. The abdomen nearly symmetrical, except for the slight swelling on the right lateral margin of the 1st segment.

The grasping antenna has each a serrated upper margin on the 18th and 19-20-21st segments; the 22nd segment has a process on the distal upper margin. The right 5th leg has a small thumb-like process on the 1st joint of the exopod; the last joint has a transparent outgrowth. The left leg has 4 short teeth on the distal margin and fine hairs on the inner margin of the terminal segment.

*Occurrence*. Common both in summer and winter seasons.

*Distribution*. The species has been recorded from the Pacific near Hong-kong, Red Sea, Maldive and Laccadive Archipelagoes, Malay Archipelago, Indian seas and Great Barrier Reef region.

### *Labidocera japonica* MORI.

*Labidocera japonica*, MORI, 1935, p. 103, 105, pl. i; MORI, 1937, p. 94, pl. 43, figs. 9-12; pl. 44, figs. 1-2; BRODSKY, 1950, p. 411, text-fig. 292.

*Female*. Length, 1.81-2.06 mm. The head has side hooks. The last thoracic segment symmetrical, produced on each side into a ventrally directed wing-like projection. The abdomen 3-jointed; the genital segment has a lateral swelling on the right side; the other segments and furca symmetrical.

The 1st antenna 23-jointed, extends to the end of the anal segment. The 5th pair of legs slightly asymmetrical; the exopod tapers into a spine furnished with 3 small outer marginal spines; the endopod differentially denticulated on the apical section.

*Male*. Length, 1.67-1.91 mm. The last thoracic segment asymmetrical, the right side is produced into a stout spine. The abdomen 5-jointed, symmetrical;

the segments and furca are in 0.01 mm as 9:8:9:4:2:9; the genital segment has a spine on the ventral distal corner of the right side.

The grasping antenna has serrated upper margin on the segments 18, and 19–20–21; the 22nd segment has a moderately long process on the distal upper margin. In the 5th pair of legs the thumb-like process of the 1st joint of the exopod of the right leg slender; the palm is furnished with a blunt process on the middle of the outer margin; the distal segment slender ending in a strong spine, the inner margin of the segment is furnished with 3 marginal spines. In the left leg the distal segment has 3 spines, an aesthetasque-like seta and a rounded process furnished with tuft of hairs.

*Occurrence.* Very common in summer time.

*Distribution.* The Pacific coast of Japan, Japan Sea and far-eastern and polar seas of the USSR.

### *Labidocera bipinnata* TANAKA.

*Labidocera bipinnata*, TANAKA, 1936, p. 31 pl. iii; MORI, 1937, p. 94, pl. 43, figs. 1–8; BRODSKY, 1950, p. 413, text-fig. 291.

*Length.* Female, 1.16–1.86 mm; male, 1.42–1.62 mm. The species is fairly common in Japanese waters of temperate regions. MORI's specimen from the Yellow Sea are larger in size (♀, 0.25; ♂, 2.0 mm) than those from the Pacific coast of Middle Japan.

### Genus *Pontella* DANA.

A. SCOTT recorded the occurrence of the following 8 species from the Malay Archipelago: *Pontella danae* GIESBRECHT, *P. fera* DANA, *P. princeps* DANA, *P. securifer* BRADY, *P. alata* A. SCOTT, *P. denticaudata* A. SCOTT, *P. forcicula* A. SCOTT, and *P. cerami* A. SCOTT. SEWELL reported 9 species from the Indian seas, namely, *P. andersoni* SEWELL, *P. danae*, *P. danae* var. *ceylonica* THOMPSON and A. SCOTT, *P. denticauda*, A. SCOTT, *P. fera*, *P. investigatoris* SEWELL, *P. princeps*, *P. securifrons* and *P. spiniceps* GIESBRECHT. From the Arabian Sea 2 species of the genus, *P. fera* and *P. securifer* have been recorded by SEWELL. No species have been recorded from the far-eastern seas of the USSR. From the adjacent seas of Japan MORI recorded the occurrence of *P. spinicauda* MORI, and *P. longipedata* SATO. From the Izu region the following species have been detected in my collections: *P. securifer*, *P. princeps*, *P. chierchiaie*, *P. fera*, and *P. kieferi* PESTA.

### *Pontella securifer* BRADY.

(Fig. 234, a–f)

*Pontella securifer*, GIESBRECHT, 1892, p. 461, t. 2, 24, 41; A. SCOTT, 1909, p. 160; FARRAN, 1929, p. 277; SEWELL, 1932, p. 384; WILSON, 1932, p. 151; FARRAN, 1936, 117; WILSON, 1950, p. 297, pl. 16, figs. 207-214; pl. 27, figs. 421-425.

*Female*. Length, 4.07-4.38 mm. The head has side hooks and 3 lenses, dorsal, ventral and rostral ones. The last thoracic segment asymmetrical, the left side is more produced posteriorly. The abdomen 2-jointed; the genital

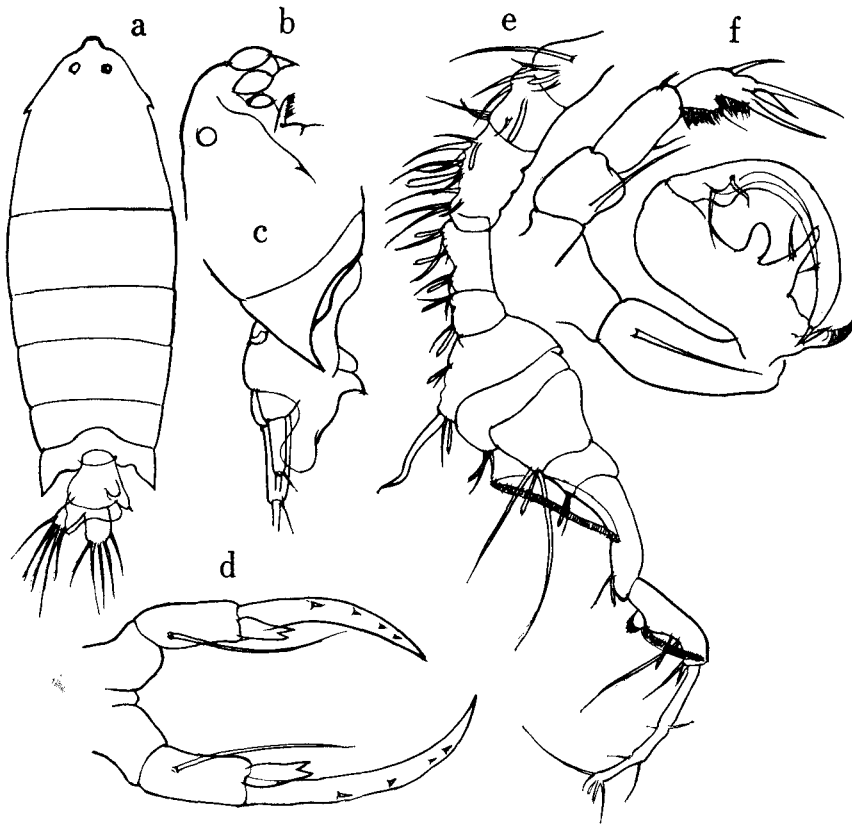


Fig. 234. *Pontella securifer* BRADY.

Female: a, dorsal aspect; b, head, lateral aspect; c, last thoracic segment and abdomen, lateral aspect; d, 5th pair of legs. Male: e, clasper antenna; f, 5th pair of legs.

segment asymmetrical, extends posteriorly over the left furcal ramus on the dorsal surface, and has 2 processes variable in position. The furca asymmetrical.

The 1st antenna reaches back to the 3rd thoracic segment. The 5th pair of legs asymmetrical; the exopod ends in a strong spine and is furnished with 4 small spines on the outer margin; the endopod bifurcate at the apex,

shorter than  $1/3$  the length of the exopod.

*Male.* Length, 3.62–4.00 mm. The last thoracic segment symmetrical. The abdomen 5-jointed, the segment and furca are in the proportional lengths as  $27:13:18:7:5:30=100$ . The grasping antenna has a large ctenate process on the 18th segment; the segments 19–20–21 has 2 processes, of which one is protruded and coarsely denticulated; the 14th segment carries a large spine on the anterior margin.

In the 5th pair of legs the thumb-like process on the 1st segment of the right leg is short and curved; the palm of the segment carries a large conical process and a papilla-shaped one. In the left leg the last segment of the exopod bears 3 apical spines and an outer marginal one; the inner margin of the segment is furnished with tufts of hairs.

*Occurrence.* Common in summer and autumn in the Izu region.

*Distribution.* The species has been recorded from the warm regions of the Pacific and Indian Oceans, and also from the Hoods Hole regions, and Japan Sea.

*Pontella princeps* DANA.

(Fig. 235, a–d)

*Pontella princeps*, GIESBRECHT, 1892, p. 461t, t. 24, 40; A. SCOTT, 1909, p. 160; SEWELL, 1932, p. 382; WILSON, 1950, p. 295.

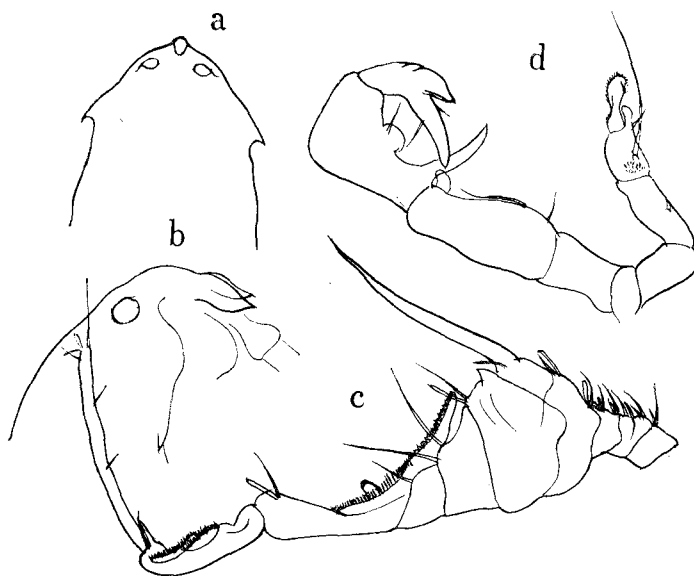


Fig. 235. *Pontella princeps* DANA.

Male: a, head, dorsal aspect; b, head lateral aspect; c, clasper antenna; d, 5th pair of legs.



*Male.* Length, 4.57 mm. The last thoracic segment produced on each side into a lateral spine. The rostrum short with a slight indication of lens. The genital segment slightly asymmetrical, has a low swelling on the left side; the 3rd segment about as long as the 1st segment.

The left antenna extends about to the end of the 3rd thoracic segment. The right antenna has each a serrated plate on the 17th and 18th segments; the segments 19-21 has two ctenate plates and a spine on the anterior distal margin.

The right 5th leg has a slender thumb-like process on the 1st joint of the exopod; the inner margin has a conical swelling; the distal segment has a long process about as long as the thumb-like process of the inner distal margin. In the left leg the distal segment of the exopod is finely denticulated on the inner and distal margins.

*Occurrence.* Rare in the Izu region.

*Distribution.* Recorded from the warm regions of the Pacific and Indian Oceans and Malay Archipelago. In Japan it is rather frequent in the Japan Sea.

*Pontella chierchiaie* GIESBRECHT.

(Fig. 236, a-j)

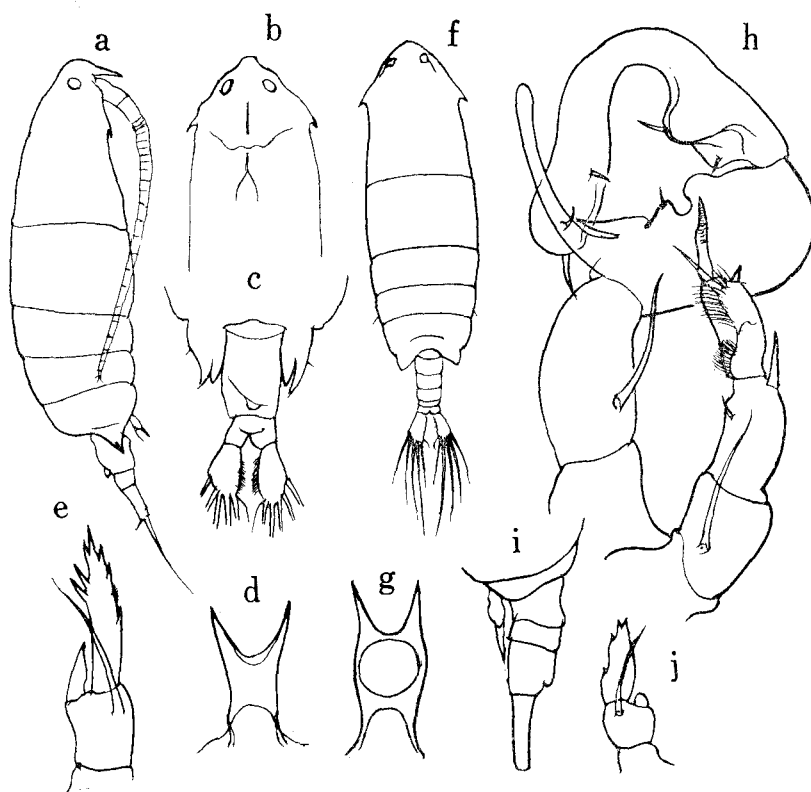
*Pontella chierchiaie*, GIESBRECHT, 1892, p. 462, t. 24, figs. 12, 27, 38; t. 4, figs. 19, 22, 26, 35; GIESBRACHT and SCHMEIL, 1898, p. 143; *P. bifurcata*, TANAKA, 1936, p. 33, pl. vi-v, (female); *P. forcipata*, TANAKA, 1936, p. 34, pl. vi (male); WILSON, 1950, p. 291, pl. 28, figs. 408, 409.

*Female.* Length, 3.35 mm. The last thoracic segment ends into a bifurcated spines on either side; the outer spine of the left side outwardly curved. The abdomen 2-jointed; the genital segment produced slightly on the left lateral margin; the dorsal surface of the segment is furnished with a low process arising from the distal margin of the segment. The furcal rami slightly asymmetrical, the right ramus longer and wider than the left.

The 5th pair of legs symmetrical; the distal end of the exopod terminates into 2 spines of which the inner one is longer; the inner margin bears 2 spines; the outer margin has 3 marginal spines.

*Male.* Length, 2.95 mm. The last thoracic segment and abdomen symmetrical. The head has a rostral and a ventral lenses. The right 5th leg has a slender thumb-like process on the 1st segment of the exopod; the inner margin of the palm is furnished with processes and spines; the last segment curved, the basal part inwardly produced; the distal part dilated.

*Occurrence.* The species, is rare in the Izu region. A great quantity of the specimen visited the Izu region on 21st September, 1936.

Fig. 236. *Pontella chierchiae* GIESBRECHT.

Female: a, lateral aspect; b, head, dorsal aspect; c, last thoracic segment and abdomen, dorsal aspect; d, rostrum; e, 5th leg. Male: f, dorsal aspect; g, rostrum; h, 5th pair of legs. Female, juv.: i, last thoracic segment and abdomen, lateral aspect; j, 5th leg.

*Distribution.* The species has been recorded from the Pacific near Hong-kong, China Sea and Japan Sea.

*Pontella fera* DANA.

(Fig. 237, a-d)

*Pontella fera*, GIESBRECHT, 1892, p. 462, t. 20, 24; A. SCOTT, 1909, p. 159; SEWELL, 1932, p. 118; WILSON, 1950, p. 293, pl. 28, fig. 41.

*Female.* Length, 3.0-3.33 mm. The head separates from the thoracic segment. The abdomen is contained about 4 times in the length of the cophalothorax. The last thoracic segment symmetrical, produced on each side into a small point. The rostrum slender with a slight trace of lens; the dorsal lens moderately large; the ventral lens rounded with deep indigo colour.

The abdomen 2-jointed asymmetrical; the 1st segment with an outer marginal process on the left side; the ventral surface of the segment has a process on the proximal part of the genital opening; these processes of the genital segment are variable in shape according to age. The anal segment slightly asymmetrical. The furcal rami slightly asymmetrical.

The 1st antenna 22-jointed extends to the middle of the 3rd thoracic segment. The 5th pair of the legs symmetrical. In some specimens the endopod asymmetrical, that of the right leg conical and pointed.

*Male.* Length, 2.81-3.00 mm. The cephalothorax and abdomen symmetrical.

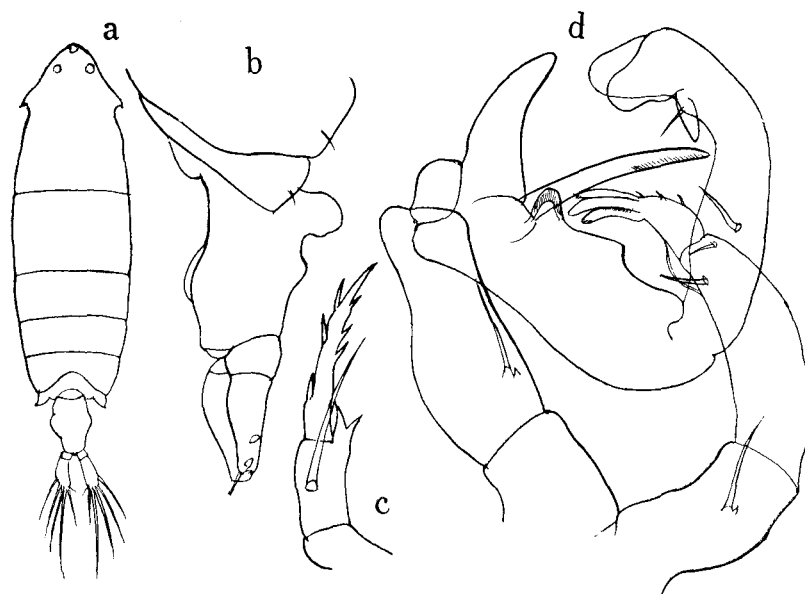


Fig. 237. *Pontella fera* DANA.

Female: a, dorsal aspect; b, last thoracic segment and abdomen, lateral aspect; c, 5th leg. Male: d, 5th pair of legs.

The abdomen is contained about 3.4 times in the length of the cephalothorax. The abdominal segments and furca are in the proportional lengths as 21:18:18:7:4:33=100.

The grasping antenna has a curiously shaped process with serrated upper margin on the 17th and 18th segments. The last segment of the exopod of the right 5th leg is dilated and spoon-shaped.

*Occurrence.* Rare in the Izu region. A great quantity of the specimen visited the Izu region on 21st September, 1936.

*Distribution.* Recorded from the Malay Archipelago, Indian seas, Barrier Reef Sea and the Japan Sea.

*Pontella kieferi* PESTA.

(Fig. 238, a-h)

*Pontella kieferi*, PESTA, 1933, text-fig. 1-6; *P. barbata*, TANAKA, 1936, p. 32, pl. iv, figs. 1-11; pl. v, figs. 1-2.

*Female*. Length, 5.35 mm. The last thoracic segment symmetrical. The abdomen 2-jointed; the genital segment asymmetrical, the left lateral margin

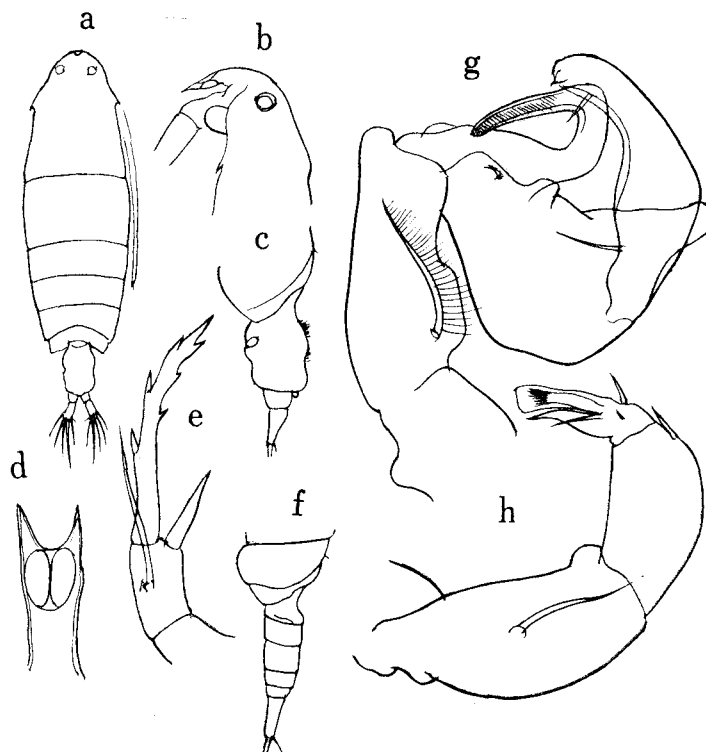


Fig. 238. *Pontella kieferi* PESTA.

Female: a, dorsal aspect; b, head, lateral aspect; c, last thoracic segment and abdomen, lateral aspect; d, rostrum; e, 5th leg. Male: f, last thoracic segment and abdomen, lateral aspect; g, right 5th leg; h, left 5th leg.

of the segment produced proximally; the dorsal surface of the segment is furnished with scattered hairs.

The 1st antenna extends posteriorly to the distal end of the 2nd thoracic segment. The 5th pair of legs symmetrical with slender exopod furnished with 3 spines on either of the outer and inner margins; the endopod slender, pointed at the apex.

*Male.* Length, 2.99 mm. The last thoracic segment and abdomen symmetrical. In the right 5th leg the thumb-like process of the 1st segment of the exopod curved rectangularly and striated at the apical portion; the palm is broad; the distal segment swollen at the proximal portion. In the left leg the distal segment is equipped with a tongue-shaped process and a strong curved spine haired on either of the lateral margins.

*Occurrence.* One female and a male from Sagami Bay.

*Distribution.* The species has been recorded from the South China Sea.

#### Genus *Anomalocera* TEMPLETON.

WOLFENDEN recorded *Anomalocera patersoni* TEMPLETON from the Laccadive Archipelago but the species has not been recorded from the Malay Archipelago and Indian seas. The species is of cold water in origin and has been often recorded from the North Atlantic. MARUKAWA recorded the occurrence of the species from the Okhotsk Sea.

#### Genus *Pontellopsis* BRADY.

A. SCOTT (1909) recorded the occurrence of 8 species of the genus from the Malay Archipelago, namely, *Pontellopsis armata* (GIESBRECHT), *P. krämeri* (GIESBRECHT), *P. perspicax* (DANA), *P. regalis* (DANA), *P. strenua* (DANA), *P. villosa* BRADY, *P. pera* A. SCOTT, and *P. macronyx* A. SCOTT. SEWELL (1932) recorded *P. herdmanni* THOMPSON and A. SCOTT, *P. krämeri*, *P. regalis*, *P. armata*, *P. perspicax*, *P. scotti* SEWELL, and *P. villosa* from the Indian seas. From the Japanese waters MORI recorded the occurrence of *P. armata*, *P. perspicax*, *P. tenuicauda* (GIESBRECHT), and *P. yamadae* MORI. I have detected the following species from the Izu region: *P. regalis*, *P. villosa*, *P. armata* and *P. yamadae*.

#### *Pontellopsis regalis* (DANA).

(Fig. 239, a-f)

*Pontellopsis regalis*, GIESBRECHT, 1892, p. 486, t. 1, 26, 41; A. SCOTT, 1909, p. 171; SARS, 1925, p. 239; FARRAN, 1929, p. 280; WILSON, 1932, p. 157; FARRAN, 1936, p. 118; WILSON, 1950, p. 310.

*Female.* Length, 3.37–3.65 mm. The head without side hooks, separates from the 1st thoracic segment. The posterior corner of the last thoracic segment symmetrical, ends in wing-like expansions. The rostrum with slender filaments; the ventral eye very large, the labrum produced ventrally with stiff hairs on the apex.

The abdomen 2-jointed; the genital segment has a strong process on the

right distal margin and a small protuberance on the left lateral margin.

The 1st antenna 16-jointed reaches back to the distal margin of the 2nd thoracic segment; the 6th segment has a strong spine on the anterior distal margin.

The 1st leg has 3-jointed exopod and endopod. The 5th pair of legs symmetrical; the exopod about 4 times as long as the endopod; the outer margin of the exopod is furnished with 3 small spines.

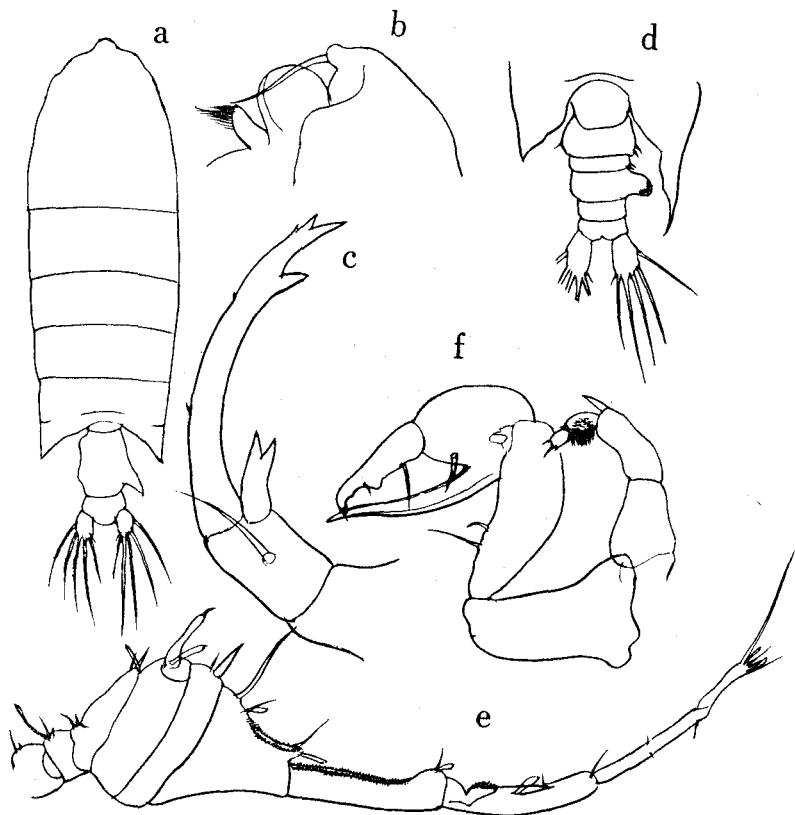


Fig. 239. *Pontellopsis regalis* (DANA).

Female: a, dorsal aspect; b, head, lateral aspect; c, 5th leg. Male: d, last thoracic segment and abdomen, dorsal aspect; e, clasper antenna; f, 5th pair of leg.

*Male.* Length, 3.08-3.22 mm. The last thoracic segment and abdomen asymmetrical. The 1st abdominal segment is much wider than the 2nd; the 3rd segment has a large protuberance on the left margin. The furcal rami symmetrical.

The middle section of the grasping antenna much swollen. The right 5th leg has a thumb-like process much longer than the distal segment of the

exopod, and the segment is furnished with a small triangular process on the inner margin about the middle.

*Remarks.* The present male specimen, though, smaller in size reported by GIESBRECHT agrees well with his description and figures. In the female the long process of the lateral margin of the genital segment is the characteristics of the Pacific specimen.

*Occurrence.* The species is rather rare in the Izu region.

*Distribution.* The species has been recorded from the warm regions of the Pacific, Atlantic and Indian Oceans, also recorded from the Malay Archipelago, Mediterranean Sea and Japan Sea.

*Pontellopsis villosa* BRADY.

(Fig. 240, a-h)

*Pontellopsis villosa*, GIESBRECHT, 1892, p. 486, t. 26, 41: A. SCOTT, 1909, p. 172; SARS, 1925, p. 155; SEWELL, 1932, p. 390; WILSON, 1950, p. 314, pl. 30, figs. 462.

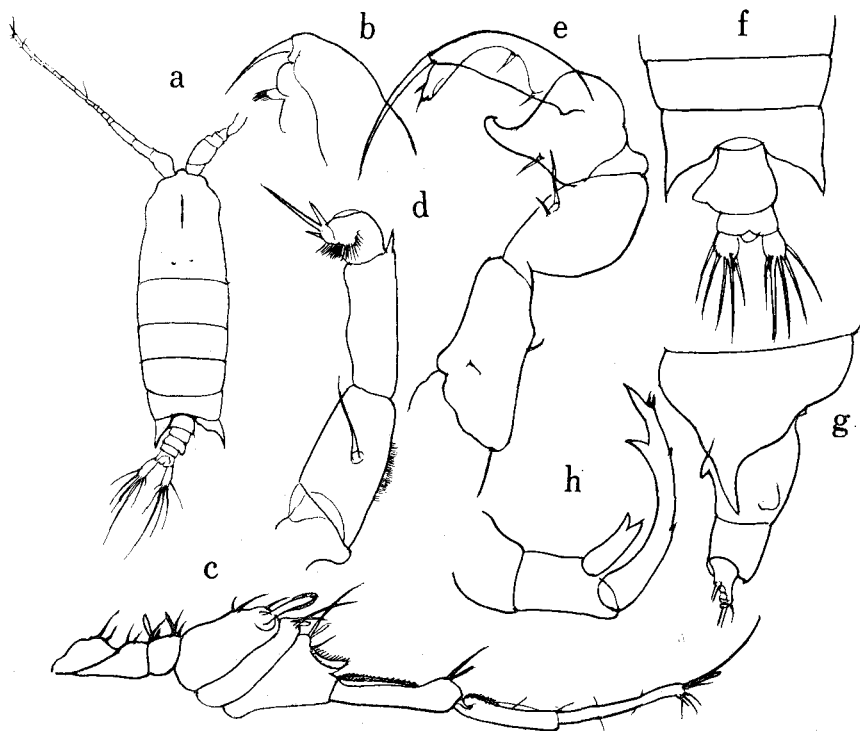


Fig. 240. *Pontellopsis villosa* BRADY.

Male: a, dorsal aspect; b, head, lateral aspect; c, clasper antenna; d, left 5th leg; e, right 5th leg. Female: last thoracic segment and abdomen, dorsal aspect; g, last thoracic segment and abdomen, lateral aspect; h, 5th leg.

*Male.* Length, 2.27 mm : cephalothorax, 1.77 mm : abdomen, 0.50 mm. The last thoracic segment symmetrical, with an acute spine on each side extending about to the distal margin of the genital segment. The rostrum slender and long.

The abdomen 5-jointed; the genital segment has a large triangular process on the left lateral margin. The grasping antenna has a very stout spine on the segments 13-14. The right 5th leg has a long seta on the distal segment of the exopod.

*Occurrence.* The species is rare in the Izu region. Only a single male was collected in July 1936. A single female obtained from the warm region of the Japan Sea measured 2.7 mm.

*Distribution.* The species has been recorded from the warm regions of the Pacific, Atlantic and Indian Oceans, Malay Archipelago and Japan Sea.

*Pontellopsis armata* (GIESBRECHT).

*Pontellopsis armata*, GIESBRECHT, 1892, p. 486, t. 26, 41; A. SCOTT, 1909, p. 170; SEWELL, 1932, p. 385; MORI, 1937, p. 97, pl. 45, figs. 5-8; WILSON, 1950, p. 304, pl. 30, figs. 450-542.

*Female.* Length, 2.45 mm; cephalothorax, 1.95 mm; 0.50 mm. The cephalothorax moderately robust and symmetrical; the last thoracic segment produced on each side into a long spine reaching the middle of the anal segment.

The abdomen 2-jointed, slightly asymmetrical; the genital segment about as long as the anal, carries a rounded process on each of the lateral margins; the ventral surface of the segment has a small triangular process near the proximal; the anal segment broad and has a low swelling on the proximal dorsal surface. The furcal rami symmetrical.

The 5th pair of legs symmetrical; the exopod bears 3 apical and 3 small outer marginal spines; the endopod about half as long as the exopod, bifurcate at the apex.

*Occurrence.* Very rare in the Izu region, only one female in surface collections.

*Distribution.* The species has been recorded from the warm regions of the Pacific, and Indian Oceans, Maldive and Laccadive Archipelagoes, and Japan Sea.

*Pontellopsis yamadae* MORI.

*Pontellopsis yamadae*, MORI, 1937, p. 98, pl. 47, figs. 1-6; pl. 48, fig. 13.

*Female.* Length, 2.24-2.87 mm. The cephalothorax robust and symmetrical about 2.6 times as long as the abdomen. The last thoracic segment produced



into a narrowly rounded process on each side. The rostrum slender and long.

The abdomen 2-jointed; the genital segment produced laterally on each side and has 2 dorsal spines; the anal segment prolonged posteriorly. The furcal rami symmetrical, about as long as wide.

The 1st antenna 16-segmented, extends to the end of the 3rd thoracic segment. The other appendages are similar in structure to those of the other members of the genus.

The 5th pair of legs symmetrical; the exopod ends in 2 strong spines subequal in length and 3 small spines on the outer margin; the endopod about 1/3 the length of the exopod, terminates in 2 subequal spines.

*Male.* Length, 2.48 mm: cephalothorax, 1.84 mm abdomen, 0.64 mm. The last thoracic segment produced into a long stout spine on the right side reaching the middle of the 4th abdominal segment.

The abdomen 5-jointed, symmetrical; the 2nd segments carries a rounded process on the right side. The furcal rami 2 times as long as wide.

The abdominal segments and furca are in the proportional length in 0.01 mm, 18:7:8:7:8:18.

The grasping antenna is of the type found in *P. regalis* (DANA); the segments 16-17 has 2 rows of fine teeth on the anterior margin and produced in a triangular process overlapping the segment 18 which is furnished with a toothed upper margin; the segments 19-20-21 are furnished with 7 sharp teeth on the proximal part and a sword-shaped process reaching the distal end of the segment; the segments 22-25 are fused.

The 5th pair of legs as in *P. strenua* (DANA); the thumb-like process of the 1st segment of the exopod of the right leg slender; the left leg has a slender outer marginal spine on the 1st segment of the exopod; the distal segment has 3 apical spines of which the innermost one very small.

*Occurrence.* One adult female and a male from Sagami Bay, December, 1931.

*Distribution.* Yellow Sea and Japan Sea.

### Genus *Pontellina* (DANA).

The genus is represented by a single species, *Pontellina plumata* (DANA). The species is very common in the adjacent seas of Japan.

### *Pontellina plumata* (DANA).

*Pontellina plumata* GIESBRECHT, 1892. p. 287, t. 4, 25, 40; A. SCOTT, 1909, p. 175; MORI, 1937, p. 100, pl. 47, figs. 7-11; pl. 48, 1-12; WILSON, 1950, p. 303.

*Female.* Length, 1.54-1.90 mm. The cephalothorax ovate and robust. The posterior termination of the last thoracic segment is variable in shape; they

are acuter than figured by GIESBRECHT. The abdomen 2-jointed; the anal segment slightly asymmetrical, fused with the furca.

The 1st antenna 17-jointed, extends to the end of the furca. The mouth parts are furnished with plumose setae.

The 5th pair of legs symmetrical; the exopod about 3 times as long as the endopod, and bears 3 long terminal setae; the endpod bifurcate at the apex.

*Male.* Length, 1.41-1.70 mm. The last thoracic segment shows 3 different types.

*Occurrence.* Very common in winter season in the Izu region.

*Distribution.* The species is widely distributed in the Pacific, and Atlantic Oceans.